



# BULLETIN OF THE MASSACHUSETTS ARCHAEOLOGICAL SOCIETY



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## Editor's Note

This Fall issue will be my last as Editor of the *Bulletin*. I have greatly enjoyed serving in this position over the past 10 years, especially in working with the authors to produce more polished articles for publication. I learned proofreading skills as a teenager at a Manhattan print shop, and this prepared me well for a lifetime career correcting student papers. It also provided valuable skills which I have applied to the copy-editing of this *Bulletin*. But it is always helpful to have several pairs of eyes look over a draft document, and I wish to thank our loyal assistant editors – Kathy Fairbanks, Bill Moody, and Mary Ellen Lepionka – for catching numerous errors which I missed.

If at times the articles I have published have pushed the edges of archaeology, I consider this to be a sign that archaeological science in Massachusetts is healthy and is capable of self-correction and improvement. I turn over the task of editorship to Ryan Wheeler, who I am certain will maintain the high standards of both content and felicity of expression which have been the hallmarks of our Society's *Bulletin* for its entire run of 79 years.

Ashland MA  
November 2018

## Parker's Revenge Revisited

Barbara Donohue

Most, if not all of us know the events of April 19, 1775. British soldiers marching from Boston to Concord engaged Captain John Parker's militia on Lexington Green, killing eight and wounding ten. News of the incident spread quickly. By noon, when the British began their march back from Concord to Boston, the countryside was filled with angry militia companies. As the British soldiers reached the line between the towns of Lincoln and Lexington, Captain John Parker and his Lexington militia were waiting for them and when the British were close, the militia opened fire. Following the initial attack, Major Pitcairn sent his British forces charging up the rocky hillside, causing Parker's men to retreat to the crest of the nearby hill.

Perhaps the most complete analysis of the primary and secondary sources that recount the day's events was done by Douglas P. Sabin, a staff historian for Minute Man National Historical Park (MIMA). Sabin found many secondary sources to be either inaccurate in certain details, descriptive without bibliographic reference, or subject to author bias. Depositions taken from both British and Americans soldiers providing testimony for the occurrences at Lexington Green and at North Bridge in Concord were for the most part sub-

jective. While diaries from two British soldiers, MacKenzie and Sutherland, provide accounts of the battle in adequate detail, these accounts have been subject to various interpretations. Sabin concluded that there is no objective account of the entire battle (Sabin 1987). Even militia companies, which have done considerable research on the battle, have little specific information about the day's activities (Historians of the Council of Minute Men 1977).

So what are the details of the Parker's Revenge battle, and where did the fighting occur? This article discusses previous investigations into Parker's Revenge, leading to a specialized archaeological intensive (locational) survey (Donohue 2006) conducted from 2003 to 2005 that found the first artifacts associated with what is considered the first planned battle of the Revolutionary War.

### Twentieth-Century Archaeological Investigations

MIMA was established in 1959 to commemorate the events of April 19, 1775. A four-volume report (Towle and MacMahon 1986a, 1986b, 1986c, 1987)



documents three years of work analyzing collections and evaluating site interpretation for archeological surveys conducted within the park from 1963 to 1986. Archeological investigations within the surveyed areas, which were divided into five zones, were site-specific and designed to investigate the 1775 landscape. The location of Parker's Revenge is most closely associated with the Nelson Road Area, which included the Tabitha Nelson Site (also the Thomas Nelson, Sr. Site), the Thomas Nelson, Jr. Site and the Josiah Nelson Site. Of the eight sites excavated within the Nelson Road Area, only 24 (.0008%) out of a total of 31,071 artifacts were weapon-related (Towle and MacMahon 1986c). While artifacts associated with the battle could have been reused or collected by others through the years, these results could also shed light on where the battle was/was not fought.

Archaeological investigations at Hanscom Air Force Base (AFB) began in 1992 when a reconnaissance archaeological survey (King et al. 1992) identified 34 areas of moderate to high archaeological potential. The survey concluded that as the southern boundary of the base, adjacent to MIMA, was "within the April 19, 1775 battlefield area" sites associated with the events of that day including Parker's Revenge may be located there.

In 1998, an intensive (locational) survey (Abell et al. 1998), consisting of the excavation of 40 x 40-cm shovel test pits at 25-m intervals, was conducted in the 34 areas of archaeological potential. The survey concluded that even though "no evidence of the military engagement between the British Army and the Colonial Militia was encountered, . . . archaeological manifestations of the skirmishes fought that day . . . may still exist at Hanscom AFB in isolated pockets of preservation." The survey recommended "a more intensive form of archaeological survey; one that employed detection technology such as . . . metal detectors for the ballistic evidence."

### Twenty-first Century Archaeological Investigations

As a result of the intensive (locational) survey (Abell et al. 1998), the Air Force Center for Environmental Excellence (AFCEE) requested that a specialized archeological survey, consisting of a met-

al-detector survey followed by field excavation, be conducted in the areas with potential for battlefield debris associated with the Battle of April 19, 1775. The recommended specialized archaeological survey, which is the focus of this article, was conducted by Timelines, Inc. (later part of John Milner Associates, Inc.). The metal detector survey was conducted in October of 2003, followed by a magnetic field gradient (hereafter magnetometer) survey in October of 2004 (Donohue 2006).

As the Principal Investigator for the specialized archaeological survey, I was both excited about the prospect of finding artifacts associated with such a defining moment in our country's history and also doubtful that we would find anything associated with the battle, being so far removed from Battle Road.

### *The Metal Detector Survey*

The metal detector survey was conducted in six of the 34 areas of archaeological potential that were identified in the previous archaeological reconnaissance survey (King et al 1992), as those areas were considered to have potential for battlefield debris (Figure 1). Having trained with Dr. Lew Somers at Fort Phil Kearny in Wyoming, I felt it was important to have someone conduct the metal detector survey who had experience in battlefield archaeology. I consulted with Dr. Somers, who in turn discussed the situation with Dr. Doug Scott, and Alvin Lynn of Amarillo, TX was recommended, as he had considerable experience in metal-detector surveys of both running and standing battles. Mr. Lynn was more than happy to be part of our team and made his way to Massachusetts.

Area 31, which is 14.3 acres, was the first location surveyed, as it forms part of southern border of the base with MIMA and includes a portion of the hill that according to historic accounts is where Pitcairn's British troops forced Parker's militia to retreat. A swath of man-made land bisects the parcel, which is lightly wooded. Granite outcrops, erratics, and surface rocks are located throughout. The parcel slopes down towards a wetland to the west and is crossed by two intersecting stone walls. The area is bound by a chain link fence separating the parcel from MIMA to the south, buildings and a roadway to the north, a chain link fence to the east, and an unnamed stream to the west.



Unlike typical archaeological surveys, when important artifacts are recovered in the last 15 minutes of the last day, a musket ball was discovered within the first 30 minutes of the survey. Needless to say, everyone was excited and my doubts quickly faded away. We ended up collecting twelve artifacts, eight of which were believed to be battle-related following conservation by Douglas Currie at the Mashantucket Pequot Museum and Research Center (Figure 2).

The battle-related artifacts and those that may be associated with the battle were recovered from three loci, suggesting the existence of former activity areas within the parcel (Figure 3). Locus 1, located in the western section of Area 31, is associated with the three musket balls, an oxen shoe and a brass ring (Figures 4 and 5). Locus 2, located upslope and to the east of Locus 1, is associated with the musket ball bullet mold and a colonial shoe buckle (Figure 6). Locus 3, located to the west of the parking lot adjacent to an unnamed stream, is associated with the gun fitting (Figure 7).

Unfortunately no further battle-related artifacts were recovered from any of the other five areas that were surveyed.

*Reflections on the Results of the Metal Detector Survey*  
When walking into the woods from the signage noting the location of Parker's Revenge along Battle Road, one encounters the fence that separates MIMA from Area 31 in Hanscom AFB, suggesting that Area 31, even though it is somewhat removed from Battle Road, may hold an association with Parker's Revenge.

Documentary research revealed that over 100 Lexington Minute Men under the command of Captain John Parker waited approximately four hours to ambush the British when they returned from Concord. It seems reasonable that Parker's men would have been doing something while they were waiting. If they ended up fighting the British flankers or were being pushed back by Pitcairn's troops, they could have dropped or lost items. As militia companies were known to have brought supply wagons with them to provide support items in the field, the recovery of the oxen shoe by Locus 1 may provide evidence to support the hypothesis that former activity areas do exist within Area 31.

#### *Magnetometer Survey – October 2004*

I remained in contact with Dr. Somers throughout the metal detector survey. In an effort to determine if the three loci identified in Area 31 were associated with activity areas, a magnetometer survey was suggested for Area 31. Magnetometer surveys have been successful in finding small activity areas as well as locating larger features, such as the quartermaster corral at Fort Phil Kearny in Buffalo, Wyoming. The focus of the magnetometer survey was lost or abandoned Colonial and British iron objects, which were expected to be few in number and widely scattered across the area. This type of survey is typical of North American investigations of battlefields and prehistoric sites that require a very high data sample, meticulous field procedures in instrument operation and data sample location logging. The magnetometer survey, which requires a steady hand to collect meaningful data, was conducted by Dr. Somers (Figure 8).

In order to complete the survey in the time allotted, it was decided to concentrate on surveying blocks that were located in close proximity to the three loci identified in the metal detector survey. After data was collected by the magnetometer along 20 m transects at 50 cm intervals, it was processed and two maps were generated for each area: one dominated by strong magnetic data associated with ferrous/iron anomalies and one dominated by weak magnetic data associated with disturbed soil anomalies, such as occupation or activity areas. The anomalies were then ground-truthed. While a number of artifacts were recovered, the most significant one – a fascine knife – was located in Locus 3 at the very end of the last day of field work (Figure 9).

When recovered, the tip of the fascine knife was slightly pressed down into the soil, suggesting that the handle was still attached when it had been left there. As it was orientated south-north (blade-handle) the person who left it there was most likely facing Area 31. It is curious that a farmer would have left this item in his field. Given its proximity to the gun fitting and its orientation towards Area 31, it was felt that it may hold an association with the battle, either as a weapon used by a farmer or a piece of equipment lost by a member of the Light Infantry. Following conservation, the fascine knife was determined to be from the time period under study (Figure 10).



*Reflections on the Results of the Magnetometer Survey*  
Even though the location of activity areas was not verified during the magnetometer survey, the locations of both small and large iron artifacts were mapped and then verified. While Dr. Somers first used the magnetometer to pinpoint the anomalies to be ground-truthed, he soon realized that a metal detector was better suited for this task, as it eliminated anomalies that were magnetic rocks. Lessons learned from this survey have provided several protocols for using a magnetometer to identify small weak magnetic anomalies, prehistoric or historic, in New England's glacial soils.

### Documentary Evidence vs. the Archaeological Evidence

There appears to be no documentary source that recounts the day of the battle in adequate detail. Even the exact time of the first alarm of April 19, 1775 is not recorded accurately in town histories. While some mention "around breakfast," in the "early morning," or "before noon," the specific time of day is almost impossible to discern. Written evidence detailing the exact route taken by the various militia companies is also lacking. Sabin (1985a) notes that the British officers tried to keep their flankers well off the road in order to keep the British troops beyond the effective musket range of the colonial troops. While Sabin believes that tradition supports the fact that Parker and his men ambushed the British by the Lincoln-Lexington line (Sabin 1985b,) there is considerable disagreement regarding the exact location of the ambush. Coburn (1912) notes that Parker's men fought in Lincoln "not far from Nelson and Hastings homes," French (1925) states that the ambush was further east "within the bounds of Lexington," Phinney (1825) noted that Parker and his men gave the British a "galling and deadly fire" from a field in Lincoln. and Ripley (1832) placed Parker's men in the woods within Lexington to the south of the road. The scenario may be best summed up by one of Parker's militia, Nathan Munroe, who remembered "We met the enemy within the bounds of Lincoln, but fought them in Lexington" (Coburn 1912). It is conceivable that Parker's men fought in both towns as well as from both sides of the road.

Prior to this survey, the only archeological evidence recovered from the high ground north of the road in the vicinity of Parker's Revenge is attributed to local farmer John Lannon. In 1895, Lannon uncovered a British sword (from approximately 4 feet underground) and a flat lead musket ball when removing a boulder (Coburn 1912).

Even though the artifacts from this survey are few in number, they represent a reality associated with the battle that needs more evidence for an accurate interpretation.

### *Locus 1: Musket Balls, Oxen Shoe and Cuprous Ring*

The two fired musket balls reveal that at least one person was fired at within Area 31. It appears more likely that the musket balls were fired into the area by the British rather than fired out from the area by the Americans. The unfired musket ball was probably lost by an American, as they often carried their musket balls in handkerchiefs, in pockets, or in their hats. The unfired musket ball still has the sprue, a small knob-like piece created from the hole through which metal was poured into a mold that was cut off prior to use. As the British were issued their musket balls before they left Boston, their ammunition would not have had a sprue. While the caliber of the fired musket balls could not be determined, the unfired musket ball was .70 caliber, further suggesting that it belonged to an American, as the British Brown Bess musket was .75 caliber while an American fowler musket varied between .50 and .80 caliber.

Twenty-nine (59%) of the listed historic sites within two miles of Hanscom AFB are 18<sup>th</sup> century domestic/agrarian sites. At that time period oxen, rather than horses, were used by the farmers for hauling heavy items. Prior to April 19, 1775, the people in New England met regularly to practice mobilization and marksmanship in anticipation of problems with the British. As part of that mobilization effort, people in the town collected supplies to load on wagons that would follow the militia as they marched into the field (Fischer 1994). This practice followed procedure mandated from the First Provincial Congress (1774) that the militia should be "supplied with provisions sufficient for their support" (Historians of the Council of



Minute Men 1977). While the oxen shoe could be related to local agricultural activity, it could also be associated with a supply wagon brought to the area by Parker's men.

The cuprous ring has proven to be the most enigmatic artifact. The ring is one piece of metal hand rolled around some blue silk material that is barely visible. Until such time as the use and date of this artifact can be determined, it is still considered as being associated with the time period under study.

#### *Locus 2: Musket Ball Bullet Mold and Colonial Shoe Buckle*

Many men, particularly those in the militia, brought their own bullet molds with them. When x-rayed, the chamber of the bullet mold proved to be for a .50 caliber musket ball, suggesting its use in an American fowler or a pistol. Generally only British officers carried pistols. Again, this item probably belonged to an American, as the British were issued their ammunition in Boston. Given its proximity to the colonial shoe buckle, the musket ball bullet mold was probably lost by a Minute Man from Lexington making a hasty retreat up the hill to get away from Pitcairn's troops.

The colonial shoe buckle has a design element on the outside; no information has been found to identify its source. As the shoe buckle was recovered up the hill in close proximity to the musket ball bullet mold, it likely came off the shoe of a Lexington Minute Man as he was retreating from Pitcairn's troops.

#### *Locus 3 - Gun Fitting and Fascine Knife*

When first recovered, the gun fitting appeared to be merely a split, bent strip. Its curvature though did suggest an association with a gun. Following conservation it was determined to be a fitting used under the front barrel of a gun associated with a ramrod. The weapon could have been used by either side.

The fascine knife, also known as a bill hook, is a finely made hand-wrought artifact that dates to the time period under study. Imported from Britain, the fascine knife was primarily used as an agricultural tool by many farmers of the colonial

period. Even though the fascine knife is associated with agricultural activities, it may also have been used by a local farmer as a weapon during this battle. As described in a letter, "The reason why the Militia were never a large body equal to that of the Regulars was, that the alarm being sudden, they ran in small parties with such weapons as they could first pick up, in their hurry, to different parts of the road" (Willard 1925). Fascine knives were also used by British soldiers for a variety of purposes. While the British troops who made the journey to Concord only brought enough provisions for a one day march, some of the Light Infantry who functioned as flanking troops carried fascine knives as part of their equipment in order to cut through areas of thick brush (<http://footguards.tripod.com>).

#### Ten Years Later

Following the specialized archaeological survey, the section of Hanscom AFB containing Locus 1 was included in MIMA while Loci 2 and 3 remained in Hanscom AFB.

Fortunately, further archaeological investigations continued in MIMA between 2013 and 2016 by Meg Watters Wilkes. Known as the Parker's Revenge Archaeological Project (PRAP), new evidence of the battle was recovered and mapped, revealing the location of the battle and proposed tactical scenarios engaged during the fighting between the Lexington militia and the British (Wilkes 2016).

While a lot has been done, a lot more needs to be done to fully understand the battle known as Parker's Revenge. Most recently, in a video entitled Battlefield Archaeology: Rediscovery: Parker's Revenge (<https://www.battlefields.org/learn/maps/battle-lexington-and-concord-parkers-revenge-april-19-1775>), Meg noted that it is important to continue to engage archaeological investigation on battlefields. Let's hope that archaeological investigations do continue into Parker's Revenge to help clarify the "uncertainty" of historical descriptions.



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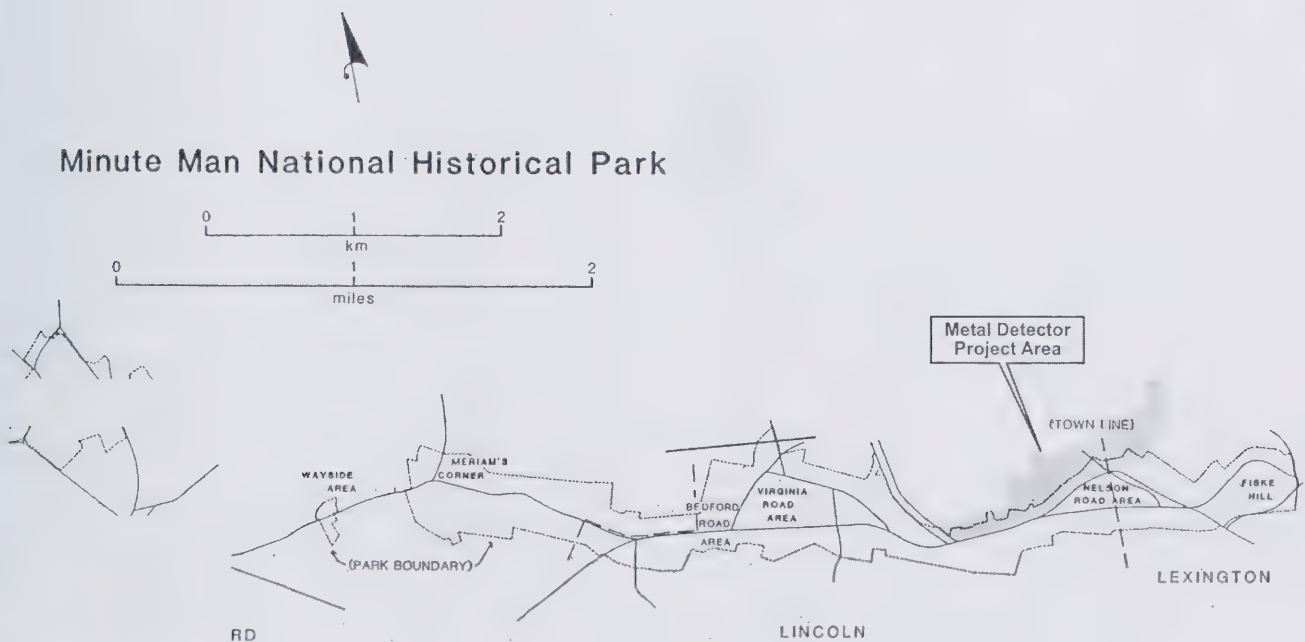


Figure 1: Map of Minute Man National Historical Park (Towle and MacMahon 1987)

Artifact	Dimensions	Post-Conservation Comments
Unfired lead musket ball (Figures 4 and 5)	18 mm diameter	Battle related, .70 caliber, ball retains pouring sprue from mold casting
Fired lead musket ball (Figure 6)	28 x 23 x 9 mm	Battle related
Fired lead musket ball (Figure 7)	2 cm diameter x 1 cm depth	Battle related, retains impression of surface that the fired ball hit (possibly bark)
Cuprous colonial shoe buckle (Figure 8)	6 x 5.1 cm	Likely battle related, from appropriate time period, found near musket ball bullet mold
Ferrous musket ball bullet mold (Figure 9)	13 x 3.6 cm	Battle related, casting chamber for .50 caliber ball, likely for a pistol
Ferrous oxen shoe shoe	Half shoe, 10.5 cm long	May be battle related, from the appropriate time period
Cuprous ring	2.9 cm diameter	May be battle related, ring is formed from sheet material rolled to enclose blue silk and cotton textile, textile emerges from flat side of ring, appears to have a colored coating.
Cuprous fitting		Likely battle related, split is not intentional but at the bottom of a worked rounded channel, possibly fitting for bottom of gun (pistol) stock under front barrel associated with a ram rod

Figure 2: Artifacts Recovered from the metal detector survey in Area 31.



Figure 3: Location of the artifacts recovered in the metal detector survey.





Figure 4: Photo of the three musket balls after conservation.



Figure 6: Photo of the bullet mold and colonial shoe buckle after conservation.



Figure 5: Photo of the oxen shoe and cuprous ring after conservation.



Figure 7: Photo of the gun fitting after conservation.





Figure 8: Dr. Somers doing the magnetometer survey.

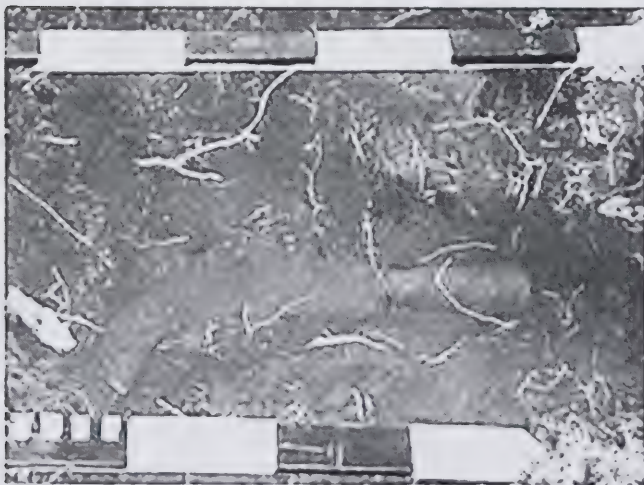


Figure 9: Test pit with fascine knife.



Figure 10: Photo of fascine knife after conservation.



## A Tribute to Michael Roberts

Marty Dudek

I have been privileged to know Michael Roberts for over 25 years, having worked with him for nearly 20 of those years and over the past six years having Friday breakfasts with him most weeks. I have heard a lot of stories – the West Coast, the South Pacific, the pirate ship, the ship in lower Manhattan, petroglyphs in Scotland, and so on. Stories like how Japanese ammunition caches were found along the shores when Michael was a boy; how Michael looked out an upstairs window and saw the ground rolling like waves on a pond during an earthquake; surfing stories; and about the 20 foot deep shell middens at Vandenberg AFB and Nike missile launches.

Unless one is aware of Michael's past, they might be surprised to know he grew up on the West Coast, was a devoted surfer and even short-term drummer for the Beach Boys before they made any serious waves. And he worked on Vandenberg Air Force base, building and blowing up missiles as an aeronautical engineer. All that changed as he became more and more interested in the shell middens on the base, and he connected with the recently formed San Luis Obispo County Archaeological Society. His fascination with the Native American past would trigger a 40+ year career in archaeological preservation.

Moving to Massachusetts, Michael became one of the early pioneers in Cultural Resource Management (CRM) in New England in the mid-1970s. At Harvard University he started the Institute for Conservation Archaeology, a front-runner of CRM firms that conducted a number of large scale projects including analysis of the outer continental shelf from the Bay of Fundy to Cape Hatteras. Many New England archaeologists who have now lived out full and devoted careers to New England archaeology had their start working for Michael in some capacity. In the 1980s Michael worked in Micronesia, also on the pirate ship Whydah off Cape Cod, and on a colonial ship uncovered in Lower Manhattan after 9/11/2001. In 1986 he started the firm of Timelines, Inc., which for nearly

20 years was an important part of CRM in New England before its merger into John Milner Associates. Among the several hundred projects conducted were several data recoveries including the Boylston Street Fish Weir, and the Central Artery Big Dig project involving colonial sites in Boston's North End and a shell midden on Spectacle Island.

I started working with Michael in 1992. At that time, I was afraid of computers and Michael made me data manager for the Central Artery archaeology. We had more than one office then, and I did not see Michael often. When he showed up he could be something like a crusty New England sea captain barking out commands. Within a couple of years we were down to one office and I came to know Michael and everyone else at Timelines pretty well. We were like family, dysfunctional at times, and living check by check, but we did some pretty good work and learned a lot in the process.

There are five qualities that I would characterize Michael by. The first is Friendship. He was a man of wisdom and experience and a mentor to more than a few people; but above those he was a friend first and foremost to those close to him.

Loyalty – He believed in us and our abilities, and in our ability to grow to meet new project situations and challenges and develop the skills we needed to do them. He often gave us pep talks that instilled confidence in us.

Faith – Michael had faith in the Creator and that we have a good purpose that the Creator put us here for. He was sincere in living by the ways he was taught by his *kinomageinini* (teacher) in the ceremonies and the traditions of the People (Anishnabeg), praying with tobacco, learning to live in balance, and being at peace with Creation.

Optimism – He believed that when our chips are down, another door will open for us. After Timelines merged into John Milner Associates and the economy tanked, one of the crew asked Michael

what he thought would happen if the office folded. He said with sudden enthusiasm "Timelines will rise like the Phoenix from the ashes!" He kept that optimism throughout his career.

Legacy – Michael had a deep concern for the legacy we are leaving the next 7 generations who follow us. He was concerned about preserving our historical and natural places and about sustainability. He had a deep concern for the happiness of the community. His work as Chairs of the Groton

Historical Commission and the Groton Sustainability Commission, as a Certified Trainer for the Happiness Initiative, and on the Groton Community Preservation Commission have all been to this purpose.

Michael lived out each of these qualities in his life, changing his career from weapons of mass destruction to a life dedicated to historic preservation, sustainability and being at peace with Creation. It has been an honor to have been his friend and co-worker all these years.

## Archaeological Investigations at Locus 9 of Site 19-PL-426: Liminal Occupations among the Inland, Marsh, and Sea.

David E. Leslie and Sarah P. Sportman

### Abstract

Data recovery excavations at Locus 9 of Site 19-PL-426 in Marshfield, Massachusetts recovered evidence for repeated occupations during the Middle, Late, and Terminal Archaic, as well as the Early and Late Woodland periods. Faunal and botanical remains indicate that terrestrial, marsh, intertidal, and deep ocean resources were important during these occupations, particularly in the Terminal Archaic and Late Woodland. Lithic artifacts show that nearby beach cobbles of quartz and rhyolite were important tool sources for flaked and expedient tools. The presence of groundstone tools and cultural features like storage pits, hearths, and posts suggest prolonged site occupation during the Terminal Archaic and Late Woodland periods. Vinette I-like pottery sherds and five mako shark teeth were also discovered in close association with two Terminal Archaic features, providing additional evidence for the long-term use of the site and off-shore fishing activities during this period. The near-coastal setting of Locus 9 offered pre-colonial inhabitants a suite of inland, marsh, and resources that were repeatedly exploited over the past six thousand years.

### Introduction

Locus 9 of Site 19-PL-426 is a multi-component pre-colonial Archaic, Woodland, and First Peri-

od historic archaeological site located within the grounds of the Marshfield Municipal Airport, on Marshfield Neck within the Green Harbor Marsh, which surrounds Bass Creek on the east and the Green Harbor River on the west (Figure 1). The Green Harbor Marsh is an inundated wetland, formed during the past millennia within the Bass Creek and Green River drainages as sea levels rose. During the construction of the airport in the 1960s, a local avocational archaeologist, Raymond J. Seamans Jr., collected over 1,000 Native American artifacts from the airport property; the Seamans collection was later professionally analyzed (Mahlstedt 1985). Over the last decade, reconnaissance and intensive (locational) surveys were conducted at six loci of the site (Binzen 2007; Binzen and Medina 2009). Beginning in 2013, Archaeological and Historical Services, Inc. (AHS) conducted intensive (locational) and site examination surveys of four new loci (Loci 7 – 10), as well as data recovery excavations of Loci 9 and 10 (Jones et al. 2013; Harper et al. 2017; Rae and Jones 2017; Jones et al. 2018). While the data recovery focused on both loci, this paper will focus only on the pre-colonial Native American components of Locus 9.

During the Archaic Period the area was likely drier, and the Bass Creek and Green Harbor rivers flowed through a terrestrial wooded habitat. At that time, the airport grounds represented a well-drained area of higher ground, suited to human use. The subsequent development of the marsh



during the Woodland period created a large wetland system abundant in useful plant and animal resources. The wetlands and waterways in the site's vicinity would have been an integral and familiar part of local Native American life that provided access to resources and important travel routes from the coast to more inland areas. The project area itself may have been perceived as a liminal area between the wet and dry aspects of the Native homeland (after Patton 2013). During the Late and Terminal Archaic periods, Locus 9 would have been a dry streamside area, with access to fresh water at a time of climatic aridity (Hubeny 2015). By the Early Woodland, rising sea levels brought the water closer to modern levels, after which the site would have been inundated in areas nearest to the river (Figure 2). This is evidenced by marsh peat development in Block G and in nearby Locus 10 (Rae and Jones 2017).

### Site Excavations

Soils in the project vicinity are generally nutrient-poor and unable to hold moisture, making them ill-suited for agriculture. The soils in Locus 9 are Carver loamy coarse sands: deep, excessively well-drained soils that form on pitted outwash plains, outwash plains, and moraines from thick, sandy glacio-fluvial deposits. Extensive outwash plain deposits of sand, silt, and clay with concentrations of glacial lake soils are found in the area. Soil profiles that were encountered through excavation varied by individual excavation block, but consisted of a brown (10YR 4/3) fine sandy loam plowzone that extended to a maximum depth of 30 centimeters below surface (cmbs). This layer overlays a light yellow-brown (10YR 6/4) loamy medium sand with small gravel subsoil horizon to 43 cmbs, which sat atop a light yellowish brown (2.5Y 6/4) loamy sand with gravel secondary subsoil horizon to 59 cmbs. Excavations terminated at approximately 74 cmbs in a very pale brown (10YR 7/4) coarse sand glacial horizon soil.

Locus 9 is comprised of a pre-colonial Native American component associated with Site 19-PL-426, as well as the ca. 1638 Waterman House Site (see Harper et al. 2017). Data recovery program (DRP) excavations consisted of 240 square meters excavated in eight separate blocks (Blocks A-H,

Figure 3), with the Waterman Site restricted to Block F (not shown on maps in this article). Following the excavations, the remaining portions of pre-colonial Locus 9 were subjected to machine stripping to remove the plowzone and expose potential features, which were then excavated.

Data recovery excavations at the Locus 9 pre-colonial components produced a total of 25,034 pieces of Native American cultural material. The total artifact count includes 23,988 lithic artifacts, 30 sherds of pottery, and 1,017 ecofacts (faunal and botanical). A total of 13 cultural features were found, six of which produced radiocarbon dates.

Lithic artifacts comprise the bulk of the Locus 9 assemblage (91.5%,  $n=23,988$ ). This included debitage ( $n=20,724$ ), fire-cracked rock (FCR) which was generally associated with cultural features ( $n=2,883$ ), and lithic tools ( $n=381$ ). Figure 4 displays the lithic tool counts, which include 369 flaked tools, including the following types: utilized debitage, retouched debitage, bifaces, preforms, projectile points and fragments, knives/flake knives, drills/perforators, and scrapers, as well as 12 groundstone tools/fragments (a pestle, two plummets, a large net-sinker, and eight unidentified fragments) (see Figures 5-9).

### Lithic Sourcing

Quartz dominates the lithic artifacts ( $n=12,978$ ; 54.1%) followed by rhyolite ( $n=6,592$ ; 27.5%), hornfels ( $n=480$ ; 2.0%), and quartzite ( $n=233$ ; 1%). Additionally, there are 926 (3.8%) lithic artifacts of jasper, chalcedony, argillite, chert, and other unidentified lithic materials. The flaked tool assemblage ( $n=381$ ) percentages by raw material mimic the overall percentages of raw materials: quartz tools account for 61% and rhyolite accounts for 30% of the assemblage; the remaining 9% is subdivided into the numerous minority toolstone categories. A total of 2,763 (11.5%) FCR fragments also were recovered, and many of these were recovered from hearth features.

A considerable quantity of the lithic artifacts at Locus 9 were produced from weathered cobbles. About 7% of the debitage ( $n=1,517$ ) is primary reduction debris or flakes with some remnant

cortex. In most cases, these cobbles are quartz, although cortical remnants of quartzite and rhyolite were also identified. Large cobble fragments were not common; only 61 cobbles or cobble fragments were recovered. This seems to indicate that the raw materials brought to the site were initially reduced elsewhere. A likely source is at the mouth of the Green Harbor River at Brant Rock/Blackman's Point, a short distance from the site (less than two miles by river), where cobbles of rhyolite and other local bedrock materials litter the beach. Ultimately, the sources of these glacially-transported cobbles lie in the Lynn and Mattapan volcanic formations of the Boston Basin region. The varieties of rhyolite at Locus 9, therefore, come from the Hingham, Mattapan, Blue Hills, and Sally Rock outcrops where red, red-banded, black, and gray rhyolites can be found (e.g., Skehan et al. 1979; Hallaren 1988).

Eight samples of unidentified or not definitively identified lithics from Locus 9 were sent to lithic experts Barbara Calogero and Anthony Philpotts for petrographic analysis. The field-identified brown-red rhyolite and pink Saugus rhyolite from Locus 9 were both determined to be jasper, likely from sources in Maine and Rhode Island. However, since 7% of "Saugus" artifacts consisted of primary reduction debris or flakes (n=15), this material would have arrived on site in partial cobble form, suggesting that it was probably among the glacially-deposited material at the Brant Rock/Blackman's Point beach. Most of the identified rhyolites from Locus 9 were confirmed as rhyolites, with sources including Clarendon Hills and Mattapan. A sample of "hornfels" was identified as silicified mudstone from Rhode Island. Three unidentified materials were also submitted, which were determined to be locally sourced granites and siltstones. These lithic sources are largely in line with the identified materials discussed above, and they are derived primarily from local (eastern Massachusetts and Rhode Island) sources (Jones et al. 2018).

## Cultural Features

Over 50 soil anomalies identified as possible features were documented and investigated at Locus 9. The anomalies were numbered consecutively as they were identified in the field. Through exca-

vation, 12 of these anomalies were determined to be pre-colonial Native American cultural features (Figure 5). These included hearths, postmolds, and a pit, as well as several of indeterminate type or function (Figure 3). Viable samples for radiocarbon dating were collected from six of the features, including four hearths (Features 1, 3, 5, and 10), one postmold (Feature 12), and one possible pit feature (Feature 15). Only the dated features and Feature 14 are described here.

### *Late Archaic Feature*

#### Feature 10

Feature 10, in Block D (Figure 3), was identified at 40 cmbs under a dense concentration of quartz chipping debris, and was generally basin-like in shape. Quartz chipping debris (n=1,132) dominated the lithic artifact assemblage, followed by rhyolite (n=28) and other lithics (n=14). Other recovered artifacts include six fragments of FCR, charred nut and wood fragments, and six calcined mammal bone fragments. Five charred seeds from Feature 10 were identified as Goosefoot (*Chenopodium sp.*). Charcoal from the feature yielded an uncalibrated standard radiocarbon AMS date of 4180±30 radiocarbon years before present (BP) (2 sigma 4835 to 4615 calibrated BP (calBP) - Beta #382488), indicating a Late Archaic affiliation. The feature is interpreted as a small hearth and the surrounding block is dominated by quartz debitage.

### *Terminal Archaic Features*

#### Feature 1

Feature 1, a small hearth, was identified in Block A at 30 cmbs as a roughly ovoid stain with charcoal flecking. Recovered cultural materials included 750 pieces of chipping debris consisting predominantly of rhyolite (n=575), quartz (n=79) and jasper (n=74). Feature 1 also produced a quartz biface, 16 FCR fragments, 23 charred nut fragments 49 pieces of calcined bone, and 66 pieces of charred wood.

A charred nut from Feature 1 yielded an uncalibrated standard radiocarbon date of 3500±30 radiocarbon years before present (BP) (2 sigma 3850 to 3695 calBP - Beta #382483), indicating a Terminal Archaic affiliation. Four of the nutshell fragments were identifiable as hickory nuts (*Carya sp.*) and one of the seeds was identified as bedstraw (*Galium sp.*), an herbaceous perennial plant that grows in wet areas like bogs and marshes and stream and pond margins. The calcined and highly fragment-



ed faunal assemblage included a deer-sized long-bone shaft fragment, as well as two small-medium bird long-bone fragments, small and medium mammal bone fragments, and several unidentified bone fragments. One fish tooth, identified as probable scup or tautog, also was recovered. The seasonality of the faunal and floral remains suggest Feature 1 was likely used in the fall.

The presence of nuts, bird, fish, and small and medium mammal bone fragments suggests that in the Terminal Archaic period, people at Locus 9 exploited the complete range of habitats and food resources available in the local environment.

#### Feature 5

Feature 5 was also identified in Block C, within unit S1W17 (Figure 3) at approximately 25 cmbs. In plan, the feature comprised a roughly circular dark stain with charcoal flecking and FCR within the matrix. In profile, Feature 5 appears to encompass two small pit or hearth features. Cultural materials recovered consist of 82 pieces of chipping debris (44 quartz, 1 quartzite, 36 rhyolite, and 1 jasper), a rhyolite biface, 10 fragments of FCR, charred botanical remains, and six calcined bone fragments. The bone fragments included two medium mammal (deer-sized) fragments and four unidentified bone fragments. Charcoal from Feature 5 yielded an uncalibrated standard radiocarbon AMS date of  $3500 \pm 30$  BP (2 sigma 3850 to 3695 calBP - Beta #382486), which suggests a Terminal Archaic affiliation contemporaneous with Feature 1 from Block A. The activity areas surrounding Features 1 and 5 are also dominated by rhyolite chipping debris.

#### Feature 12

Feature 12 is a postmold that was identified at 30 cmbs in Block C (Figure 3). Cultural materials recovered from the feature included quartz ( $n=24$ ) and rhyolite ( $n=6$ ) chipping debris, a possible anvil stone, 4 fragments of FCR, charred botanicals, and one unidentified calcined bone fragment. Charcoal from Feature 12 yielded an uncalibrated standard radiocarbon AMS date of  $3510 \pm 30$  BP (2 sigma 3865 to 3695 calBP - Beta #382487), suggesting a Terminal Archaic affiliation that is contemporaneous with Features 1 and 5.

#### Late Woodland Features

##### Feature 3

Feature 3, identified in Block C (Figure 3) at 25 cmbs, initially appeared to be an oblong pile of rocks surrounded by dark soils. The feature terminated at approximately 55 cmbs and was somewhat bell-shaped in profile; it may represent a former storage pit with an intrusive roasting platform/hearth at the top. Cultural material recovered from Feature 3 included 35 pieces of predominantly quartz ( $n=29$ ) and rhyolite ( $n=5$ ) chipping debris, a net-sinker, 34 pieces of FCR, charred nut, wood, and seed fragments, and two pieces of calcined bone. One of the bone fragments was identifiable as a medium mammal-sized long-bone shaft fragment, but the second piece was too small to identify. Three of the charred seeds were identifiable as cattail (*Typha sp.*) and cherry (*Prunus sp.*). Wild cherries ripen in New England in the late spring-early summer. Charred wood from the feature yielded an uncalibrated standard radiocarbon AMS date of  $880 \pm 30$  BP (2 sigma 905 to 730 calBP - Beta #382485), indicating a Late Woodland affiliation.

##### Feature 14

Feature 14 was identified based on a diffuse scatter of rocks encountered at 40 cmbs in S1W15 in Block C (Figure 3). No associated soil stain was identified, and the rock scatter was originally thought to be associated with Feature 3, which is located about a meter away in N0W16. The rock "scatter" was comprised of an axe/adze preform made from unidentified material, a large shale cobble split into several fragments along natural planes (likely non-cultural), and two granite cobbles similar to those found in Feature 3. Feature 14 also contained one medium mammal-sized calcined bone fragment, two quartz flakes, two rhyolite flakes, three FCR, a modified quartzite cobble, and a very small hammerstone or pecking stone. Feature 14 was located in proximity to the discarded drills and groundstone tool workshop described below. No charred botanicals or faunal remains were recovered from this feature, so radiocarbon dating was not possible; however, given the association with Feature 3 and the groundstone workshop, it is likely that this feature dates to the Late Woodland period.

### Feature 15

Feature 15 was found at 30cmbs, in close association with Feature 3, and approximately 15 cm to the southwest (Figure 3). The feature is a small, probable pit measuring approximately 20 x 15 cm. Recovered cultural materials included 12 pieces of chipping debris (nine quartz and three rhyolite), an unidentified groundstone tool fragment, four pieces of FCR, numerous charred botanicals, and one calcined mammal bone fragment. Charcoal from Feature 15 yielded an uncalibrated standard radiocarbon AMS date of 600±30 BP (2 Sigma 655 to 540 calBP - Beta #382484), indicating a Late Woodland association, albeit several centuries later than Feature 3.

### Cultural Materials

#### *Cores and Core Reduction*

Fifty-nine total cores were recovered from Locus 9: 38 cores; 8 blocky cores; a centripetal core; an amorphous core; a bifacial core; a conical core; four micro-cores; a pebble core; and four possible cores. These artifacts were produced from locally sourced quartz, rhyolite, and quartzite (likely from the paleo-shoreline). Quartz (n=45; 76.3%) dominated the cores, followed by rhyolite (n=12; 20.3%). One quartzite core also was recovered.

Early-stage reduction debris included 366 rhyolite and 473 quartz primary reduction flakes; 135 rhyolite and 495 quartz primary reduction debris (angular waste); another 1,001 pieces of debris have some remnant cortex. These artifacts indicate that both rhyolite and quartz cobbles were reduced on site. It is likely that the cobbles were first tested on the shoreline where they were gathered. Some rough core shaping may have then occurred on the beach, but many of these tested pieces were brought to the site with the cortical rind intact.

#### *Preform Production*

Eighteen preforms (including one possible preform) were recovered at Locus 9 and range from early-stage preform reduction to an almost completed point. Fourteen of the 18 preforms are fragments, suggesting fracture during manufacture. Ten of the preforms were produced from rhyolite, seven from quartz, and one from jasper.

### *Projectile Points*

As noted above, excavations at Locus 9 produced 83 projectile points and fragments, including 64 diagnostic projectile points (26 with possible type associations and 38 firm types), as well as 19 untyped point fragments (Figure 6). None of the projectile points were recovered from cultural features. The "untyped Small-Stemmed" category cannot be attributed to a single time period. Small-stemmed points were used from the Late Archaic through Woodland periods, and these points are not included when discussing represented time periods. Of the remaining 57 typed points, one dates to the Early Archaic (1%), seven date to the Middle Archaic (13%), 22 date to the Late Archaic (39%), eight date to the Terminal Archaic (14%), 17 date to the Early Woodland (30%), and two date to the Late Woodland (3%) (Figure 5). The dominant time periods represented by projectile point types at Locus 9 are the Late Archaic and Early Woodland periods (Figure 7).

#### *Other Flaked Tools*

Three-hundred-sixty-nine flaked stone tools were recovered at Locus 9: 130 bifaces, 17 scrapers, seven knives, 80 utilized debitage, 14 retouched debitage, five tabular choppers, one wedge, and 10 drills/perforators (Figure 8). These tool forms are indicative of the many processing activities that took place at the site (Figures 10 and 11).

#### *Biface/Biface Fragments and Knives*

One-hundred-thirty biface and biface fragments (one shale, 95 quartz, 33 rhyolite, and one unidentified lithic) and seven knives (1 quartz, 1 quartzite, and 5 rhyolite) were recovered at Locus 9. The majority (n=108; 78.8%) were recovered from Blocks A-H. Ninety-three percent of the bifaces were fragments, as were six out of the seven knives. The biface fragments indicate breakage that occurred during the initial stages of manufacture, with many having remnant cortex. Quartz comprises 73% (n=95) of the total assemblage, followed by rhyolite (25%; n=33), with the remaining 2% (n=3) being other or unidentified. Five of the seven knives are made from rhyolite (n=5), along with one of quartz and one of quartzite. The knives, with one exception, were bifacial, the other one was an expedient knife produced from a flake.



### Scrapers

Seventeen scrapers were recovered at Locus 9. Fourteen of the scrapers were produced from quartz, many of them were relatively small and they were probably made on exhausted cores. Three rhyolite scrapers were produced from bi-face fragments.

### Drills and Perforators

Eight drills and two quartz possible perforators were recovered at the site. The drill edges are notably not ground and are generally lenticular in cross-section, rather than the characteristic S-shaped bit as might be expected in a "twist-drill." Many of the drills tend to be somewhat symmetrical and made from projectile points, similar to those found at Locus 10 (Rae and Jones 2017). The asymmetry suggests that they were likely used in a mechanical device, such as a pump or bow drill, although six out of the eight drills were only tip fragments, indicating that they may have also been hafted in a knife-like fashion to facilitate firm hand-held use as awls or punches, with breaks occurring at the haft element. Five drills (62.5%) were made from quartz, two (25%) from rhyolite, and one (12.5%) from argillite. The one possible perforator is also made from quartz and is a tip fragment. This artifact has qualities similar to the drills, but with a narrower bit edge, suggesting its use as an awl or punch. Three of the drills are clustered in Block C near Late Woodland features 3, 14, and 15, while the remaining seven drills or perforators are spread throughout Locus 9.

### Utilized and Retouched Flakes

Utilized and retouched flakes represent an expedient tool class that is often produced from sizable flakes with a useable edge. Such tools are used, and then discarded when they are no longer needed, or the cutting edge has been dulled. Most of the 80 pieces of utilizeddebitage were flakes (n=64), with some utilized angular debris (n=16). The most common lithic material of utilizeddebitage was quartz (81%, n=57), followed by rhyolite (25%, n=20), and hornfels (3.7%, n=3).

### Choppers, Wedges, and Utilized Cores

Seven large processing tools were recovered at Locus 9, including five choppers, one wedge, and one utilized core. Choppers are large, often unmodi-

fied raw material, with crushing evident along the working edge. Five were recovered at Locus 9 (one shale, one possible hornfels, one quartzite, one sandstone, and one unidentified lithic). One rhyolite wedge was found at Block F. The quartz utilized core from Block B was probably used as a chopper, as evidenced by the crushing along one margin.

### *Lithic Debitage/Chipping Debris*

Eighty-six percent (n=20,724) of the pre-colonial lithic assemblage from Locus 9 is comprised ofdebitage, or chipping debris. Debitage was most commonly comprised of quartz (61.1%, n=12,671), followed by rhyolite (31.8%, n=6,595) (see Figures 10 and 11), after which smaller amounts of hornfels (2.2%, n=459), shale (0.9%, n=189), and quartzite (0.08%, n=185) were recovered. Other minority lithic materials included chalcedony, argillite, jasper, chert, and unidentified lithics.

### *Groundstone Tools*

A total of 12 groundstone or possible groundstone tools were recovered from Locus 9, including pestles, plummets, a net-sinker, and a possible preform for an adze or axe (Figures 9 and 14). The majority of groundstone artifacts were found in Block C (n=5, 42%), followed by Block F (n=3, 25%), and Block A (n=2, 17%). At Block C, a plummet, a net-sinker, a possible preform for an adze or axe, and a groundstone tool with remnant drill holes were found, indicating a possible groundstone workshop area. This groundstone workshop area is associated with Feature 14 (an unstained feature with several large rocks – see Figure 3), which is very near to Features 3 and 15, indicating groundstone tool use and production likely took place in Block C during the Late Woodland period.

### Pestles

One pestle fragment was recovered from unit N22E35 in Block F. The artifact is a fragment, measuring 110.8 mm long, 62 mm wide, and 44 mm thick and weighing 598.72gm. The pestle is finely pecked and ground along most of its surface. Flake scars are evident along one margin from the proximal to the distal end where it is cleanly broken. With no visible pecking or abrasion scars evident, it seems likely that this artifact was broken during its manufacture. Pestles are often used to grind hard foods such as nuts, although pestles were also used like rolling pins (Fowler 1963).

### Plummets

Two plummets were recovered at Locus 9. The smaller of the two plummets measures 46 mm by 35 mm and was found in Block C in unit N1W15. The plummet is teardrop-shaped and made from basalt through delicate pecking. The neck is minimally incised. The head extends 7 mm from the body of the plummet and has a polished top. The larger of the two plummets is more ovate and measures 71 mm long by 38 mm wide. It was recovered from Block F at unit N18E31. The head extends 8 mm from the body and the neck shows evidence of being incised. A small portion is missing from the lower body, but it remains functional. These artifacts were probably parts of line-fishing kits.

### Cobble Net-Sinker

A large, full-grooved cobble net-sinker made of an unidentified lithic material was found at Block C in unit N0W16 from Feature 3. The tool is manufactured from a naturally ovoid cobble measuring 99 mm by 60 mm and it weighs 598 gm. The center line of the cobble has been pecked to a depth of 2-3 mm along its long-axis. Because the opposing ends of the cobble show no evidence of wear or battering, the artifact is interpreted as a large net-sinker, rather than a hafted hammer. Its size suggests use in deep water (for a canoe).

### Native American Pottery

A total of 30 sherds of Native American pottery were recovered from Locus 9 Blocks C and G (Figure 15). Twenty-nine of the sherds are consistent with Early Woodland/Terminal Archaic styles and were recovered in Block C. Twenty-four of these sherds likely represent a single vessel and were recovered from subsoil contexts in unit S4W17. Several of these sherds, which exhibit cord-wrapped paddle markings, could be mended together, indicating they are part of a single vessel. They are technically not Vinette I, as they lack both interior and exterior cord-marking, but they are characteristic of early pottery technology and style (Kevin McBride, personal communication, 2016). A single sherd recovered from the adjacent unit S3W17, is identifiable as probable Vinette I. It is thick-bodied, with coarse mineral temper and the characteristic interior and exterior cord-marked decoration. These sherds were recovered close to Features 5 and 12, and within the area of rhyolite concentration. Similar to the rhyolite artifacts found at

Locus 9, the Vinette I-like pottery was recovered primarily from plowzone/subsoil interface and subsoil layers, as opposed to the quartz artifacts centered around the Late Woodland features, which were recovered primarily in the plowzone and plowzone/subsoil interface layers (see Figure 11). Based on the dates for these features and the stratigraphic and spatial association with rhyolite, it is likely that these pottery sherds date to the Terminal Archaic period.

Four additional Native American pottery sherds, likely from one vessel, were recovered in Block C from the subsoil in units S1W15 and S1W16. These sherds, characteristic of Late Woodland pottery styles, are thin-bodied with mineral temper and cord-wrapped stick-stamped decoration. The sherds were recovered just one meter from Feature 15, which was dated to 600±30 BP, suggesting the pottery is part of the same Late Woodland component. One additional sherd was recovered from the subsoil in unit S1W16. It is thin-bodied with mineral temper, but it is possible that it represents a different vessel. These Late Woodland sherds were found in proximity to the groundstone workshop area of Block C, the discarded drill and drill fragments, and Feature 14, suggesting a possible association. These sherds are characteristically and typologically different from the Vinette I-like pottery from the Terminal Archaic period.

In addition to the ceramics from Block C, a single sherd of Native American pottery was recovered in Locus 9, Block G, from the plowzone in unit S16W19. The sherd, which is approximately one centimeter thick, is cord-marked on the interior and smoothed on the exterior. It likely dates to the Early Woodland (Kevin McBride, personal communication, 2016). An Early Woodland quartz Rossville projectile point found nearby at S16W10 may be associated, although a Late Woodland quartz Levanna point was also found just a few meters away in S15W11.

### Faunal Remains

The recovered faunal assemblage included a total of 160 faunal specimens, the majority of which (n=155; 96.8%) were calcined. The only non-calcined specimens included five shark teeth and one fish tooth. Of the recovered faunal specimens, 71



(44.4%) were recovered from non-feature soils, and the remaining 89 (55.6%) were recovered from discrete features (discussed above). The non-feature faunal materials were recovered primarily from subsoil contexts in association with pre-colonial cultural materials, and are therefore considered part of the pre-colonial site assemblage.

#### *Taxonomic Representation*

The non-feature faunal assemblage contains 71 specimens. Mammals (n=55; 77.5%) comprise the bulk of the assemblage, followed by sharks (n=5; 5.6%) (Figure 15), and birds (n=1; 2.8%). Unidentified specimens (n=9) comprised the remaining 12.7% of the non-feature faunal assemblage. The faunal remains are discussed by excavation block below.

#### Block A

Eight calcined bone fragments and one shark tooth were recovered from subsoil contexts in Block A. A distal metapodial fragment from what is likely a white-tailed deer (cf. *Odocoileus virginianus*) was recovered in S4E0. Other mammal specimens included three fragments identifiable to the medium mammal (deer-sized) size class, including a long-bone shaft fragment, an unidentified fragment of an articular end, and an unidentified fragment. A second long-bone shaft fragment was identifiable to the size class of small-medium mammal. The shark tooth, identified as a probable short-fin mako (cf. *Isurus oxyrinchus*; Peter Burns, personal communication, 2016), was recovered in subsoil at S5E0 at a depth of 26-30 cmbs, spatially and stratigraphically similar to the Terminal Archaic associated rhyolite debitage, and very near the Terminal Archaic hearth in Block A (Feature 1).

#### Block B

Five calcined mammal bone fragments were recovered from subsoils, between 30 and 40 cmbs, in Block B. Four specimens, including a medium mammal-sized long-bone shaft fragment, a medium mammal-sized unidentified fragment, and two unidentified mammal bone fragments were recovered from N0E9. An unfused, deer-sized (medium mammal) vertebral epiphysis fragment was recovered from N1E7.

#### Block C

The largest non-feature faunal assemblage was recovered from subsoil contexts in Block C. Three shark teeth, identified as probable short-fin mako (cf. *Isurus oxyrinchus*; Peter Burns, personal communication, 2016), were recovered from subsoil contexts in S1W13, S3W14, and S4W14. A fourth tooth, also identified as probable short-fin mako, was recovered from the plowzone in S2W16. All four shark teeth were recovered near Features 5 and 12, which date to the Terminal Archaic period (similar to the shark tooth recovered in Block A), and from similar stratigraphic and spatial distributions of rhyolite debitage and Vinette I-like pottery sherds. Recovered mammal specimens included a probable white-tailed deer phalanx fragment, two medium mammal long-bone shaft fragments, 17 medium mammal-sized fragments, one small-medium mammal rib shaft fragment, and 10 unidentified mammal bone fragments. Three unidentified calcined bone fragments also were recovered.

#### Block D

Two calcined mammal bone fragments were recovered from subsoils in Block D. These include a small-medium-sized mammal bone fragment from S4E21 and a medium-mammal-sized fragment from S6E20.

#### Block E

Block E yielded a single calcined bone fragment from subsoil in N0E24 that is identified as a medium mammal-sized fragment.

#### Block H

Six calcined bone fragments were recovered from subsoil contexts in units in Block H. The recovered faunal remains included a likely white-tailed deer phalanx fragment, a medium mammal-sized long-bone shaft fragment, a small-medium mammal-sized long-bone shaft fragment, two unidentified mammal fragments and one specimen that was so fragmented that it was not possible to even assign it to a class.

The faunal assemblage from Locus 9 is small and nearly all calcined, but it provides important information about subsistence practices and site

activities. The majority of faunal remains were recovered from feature contexts (n=89; 55.6%) and a significant minority of faunal remains were recovered from non-feature subsoil contexts (n=70; 43.8%), suggesting that they date to the pre-colonial period. The overall assemblage contains a mix of mammal, bird, fish, and shark remains, indicating that the pre-colonial Native American residents of Locus 9 exploited the complete range of habitats available in the local environments. Three mammal lower limb bones are tentatively identified as white-tailed deer, and the large number of bone fragments identified as medium mammal (n=44; 27.5%) may also belong to this taxon. The small number of calcined bird bones (n=4; 2.5%) may represent two different species. The tooth identified as cf. *Sparidae* or *Labridae* (scup or tau-tog) provides evidence of Terminal Archaic period fishing of in-shore species, and shark teeth may indicate off-shore fishing activities, also during the Terminal Archaic period.

## Discussion

The density and distribution of artifacts and features across Locus 9 indicate that the site was repeatedly occupied from the Early Archaic through the Late Woodland periods. Locus 9 was most consistently used during from the Late and Terminal Archaic periods to the Early Woodland period: about 82% of the typed projectile points date to these periods and four of the six dated features returned Late and Terminal Archaic dates. A small number of projectile points diagnostic of the Early and Middle Archaic periods were also recovered from the site. None of the cultural features, however, date to these time periods, indicating that occupation was likely sporadic during the Early and Middle Archaic at Locus 9.

During the Late Archaic period, the dry stream-side location at Locus 9 seems to have been regularly used to hunt, as evidenced by a large number of diagnostic projectile points discarded on-site. It can also be assumed that tool creation and rejuvenation occurred during this period, as quartz comprises the overwhelming majority of debitage and was used commonly during this period. However, while a large quantity of both Late Archaic projectile points and quartz debitage was recovered, only

one dated feature (Feature 10) from Locus 9 was associated with the Late Archaic period. Feature 10, a small hearth, contained evidence of possible nuts, as well as chenopodium and calcined mammal bone. The area around the feature was also used for knapping: a total of 1,132 quartz flakes were recovered from within the feature. Locus 9 would have been an attractive hunting area during the Late Archaic, likely due to its terrestrial woodland location adjacent to a freshwater stream, but the dearth of Late Archaic features suggests that site use during this period was probably sporadic and very short-term.

The subsequent Terminal Archaic period marked intensified use of the site, as evidenced by several dated features from Locus 9. At Block A, Terminal Archaic Feature 1 shows evidence of hunting and trapping a wide range of prey, including fish, deer, small mammals, and birds. Like Feature 10, this hearth contained debris from knapping, including 750 flakes. Feature 2, although not discussed extensively here, was located only about 50 cm away from Feature 1. A significant amount of FCR (2.8 kg) was recovered from the unit that contained Feature 2 (S4E0), suggesting that this area might have been used to heat and/or dispose of FCR while maintaining the Feature 1 hearth. Rhyolite debitage distributions at the interface and subsoil (Figure 10) show that tools were knapped in roughly two areas to the east of these features. The concentrations of debitage immediately surround, but do not overlap with the features and may reflect knapping conducted while the hearths were in use.

Like Features 1 and 2, Terminal Archaic Feature 5 contained two adjacent small pit or hearth features. The contents also similarly included nuts, calcined mammal bones, and knapping debris. However, far fewer lithic artifacts were found in Feature 5. About a meter away, Feature 12, a post mold, returned a Terminal Archaic radiocarbon date. This feature contained charred botanicals, calcined bone, and a relatively small number of lithic artifacts. Despite the low numbers of lithic artifacts within these features, a concentration of rhyolite debitage (at the interface and in the subsoil) south of Feature 5 and west of Feature 12 can be seen in Figure 10, which is also where the Vinette I-like pottery and shark teeth were recovered. Therefore,



tool maintenance likely occurred directly adjacent to these features and is likely contemporaneous. Additionally, their almost identical radiocarbon dates (Feature 5,  $3500 \pm 30$  BP; Feature 12,  $3510 \pm 30$  BP) reaffirm that they were likely contemporaneous activity areas, which were also contemporaneous with Features 1 and 2 from Block A and the Atlantic phase occupation of nearby Locus 10 (Rae and Jones 2017).

Overall, the dated features indicate that Locus 9 was used most often during the Terminal Archaic period. This is despite the recovery of only eight diagnostic Terminal Archaic artifacts across the entire locus. The majority of rhyolite artifacts recovered from Locus 9 are likely associated with the Terminal Archaic period occupation. During this period, the site was used to prepare foods obtained through hunting and trapping mammals and birds, fishing, and gathering wild plants. The association of probable mako shark teeth with the three Terminal Archaic features may also indicate off-shore fishing played an important role in the foraging economy during this time. The dearth of diagnostic tools, coupled with knapping stations adjacent to the dated Terminal Archaic features, indicates that tools were created and curated here, but most were taken off-site. It is likely that many of these tools were later reworked and deposited at the intensive lithic workshop and possible canoe construction area at nearby Locus 10, which had contemporaneous dates with Locus 9 (Rae and Jones 2017). The range of activities carried out at Locus 9 in the Terminal Archaic period suggests that it likely served as a living area, probably associated with the specialized activity area at Locus 10. The faunal and floral remains recovered from Terminal Archaic features suggest the site was used in fall.

The presence of Vinette I-like pottery sherds in close association with the two dated Terminal Archaic features and stratigraphically and spatially associated with rhyolite artifacts and shark teeth, suggests that the pottery was probably used and discarded during the Terminal Archaic period. This suggests very early use of such pottery, predating by 400 years the accepted date range Taché and Hart (2013) present for Vinette I (3110 to 2285 BP). Taché and Hart, however, disregard many earlier Vinette I dates due to the strict protocol

they set forward in their study; any age estimate with a standard deviation over 60 years ( $\pm 30$ ) was rejected. This resulted in the elimination of 84% of Vinette I pottery dates.

Bunker (2006-2007), however, presents a 3315 BP date for charred wood associated in a feature with Vinette I pottery from the Eddy Site in New Hampshire, but residues from that pottery returned a date of 2445 BP. This may indicate a younger age for the pottery, but charred residues from pottery may be contaminated from marine food webs, which include sequestered, rather than atmospheric carbon. This makes these dates less reliable than those returned on terrestrial charred ecofacts (Hart et al. 2013). Fiedel (2001) suggests a cutoff of 3500 BP for Vinette I or steatite pottery technology, which would accord with the pottery from Block C. Lavin (2013) suggests a New England origin for Vinette I pottery during the Terminal Archaic period, and suggests that the technology may have later spread to New York and New Jersey.

Locus 9 was likely used intermittently during the Early Woodland, although none of the features returned Early Woodland dates. Meadowood and Rossville point forms ( $n=9$ ) and other possible Rossville Early Woodland points ( $n=8$ ) were found in Blocks B, C, D, E, and H, and Orient Fishtail points ( $n=1$ , Block G) have also been associated with the Early Woodland period.

Probable early pottery (Vinette I-like) sherds were also found in Block C, clustered near Terminal Archaic Features 5 and 12, and a sherd of possible Early Woodland pottery was found in Block G, near the Orient Fishtail point. The Vinette I-like sherds from Block C described above are likely from the Terminal Archaic. Rossville and Orient Fishtail points, as well as Early Woodland pottery, are sometimes associated with the Terminal Archaic Period (Lavin 2013). The presence of these points and pottery could indicate a transitional occupation between the Archaic and Woodland periods later than the Terminal Archaic occupation, or as a part of the Terminal occupation described above. The single Meadowood point, however, is more indicative of an Early Woodland occupation, at least in Block B.

The Late Woodland presence at Locus 9 reflects a

repeated use of the area, probably due to the environmental shift to a tidal marsh habitat. The area was likely inhabited by a small group, as indicated by the two possible storage pit features, two diagnostic projectile points, Late Woodland pottery, and botanical and calcined bone remnants from Late Woodland-dated features. While camped at Locus 9, people likely foraged within the marsh ecosystem to procure wetland plants, such as the cattail (seeds) found in Feature 3. Feature 3 also contained a large net-sinker, which was likely used for deep-water or surf-fishing.

The quartz debitage from Block C appears to be centered around Features 3, 14, and 15, indicating use of this raw material during the Late Woodland as opposed to the rhyolite that was likely used during the Terminal Archaic period (Figures 3 and 11). The suite of tools found in the northern portion of Block C (drills, groundstone preform for an adze or axe, large cobbles, scrapers, and utilized flakes, large net-sinker) may indicate that this area was used for processing hides, or the construction of birchbark canoes (as at Locus 10, see Rae and Jones 2017). The continuity of the maritime economy from the Terminal Archaic at Locus 9 is not unexpected, due to the coastal proximity of the site. However, large net or off-shore fishing does suggest that use of coastal resources intensified at this time at Locus 9. Despite being only 50 cm away, Feature 15 ( $600 \pm 30$  BP) returned a radiocarbon date several centuries younger than the date from Feature 3 ( $880 \pm 30$  BP). Overall, the disparate dates in Features 3 and 15 show that Locus 9 offered access to an array of resources during the Late Woodland. The rising sea levels likely made Locus 9 an attractive tidal riverside site, like Locus 10 during the Terminal Archaic (Rae and Jones 2017).

The density and distribution of artifacts and features across Locus 9 indicate repeated, short-term use during the Early Archaic through Late Woodland (although use in the latter period was likely more intensive). Despite the presumed surfeit of resources accessible at the locus, most use appears to have been short-lived: just enough time to make a small fire, repair some gear and perhaps set traps along the river. Site use during the Late Archaic and Terminal Archaic periods was the most com-

mon, based on the number of diagnostic points and radiocarbon-dated features, respectively. After this period, site use continued to reflect short-term episodes of activity during the Early Woodland, and intensive occupation once again during the Late Woodland, evidenced by dated storage pit features and pottery sherds.

Finally, the somewhat unusual recovery of several shark teeth from Locus 9 merits a brief discussion in a regional context. In Blocks A and C, near the Terminal Archaic-dated Features 1, 5, and 12, four shark teeth were recovered from the subsoil, and one was found in the plowzone. All five teeth are identified as possible short-fin mako (cf. *Isurus oxyrinchus*), but it is not possible to determine if they are from the same shark (Peter Burns, personal communication). The robust dimensions of the teeth suggest that the shark(s) represented at Locus 9 were exceptionally large makos (Gilbey 2011). It is unknown if the shark teeth were obtained through intentional hunting, an accidental/fortuitous kill, or the product of trade with another group. More rarely, it might be possible to take advantage of a shark that accidentally beached itself, but dead sharks rarely wash up, because sharks sink when they die (Handley 1996).

If the shark(s) were intentionally or opportunistically caught, the teeth suggest that the inhabitants of Locus 9 were highly skilled seafarers and fishermen. Short-fin mako sharks are aggressive, agile, and are known as the fastest sharks in the ocean. The recovery of plummets, a fish tooth, and the net-sinker from Locus 9 (as well as the possible canoe construction sites at both Loci 9 and 10) certainly suggests that inhabitants were experienced mariners. Directed hunting is probably not the most likely procurement scenario, as present-day human-shark encounters often occur while people are fishing either from shore or in open water. This likely also occurred in the past, particularly if they practiced net casting from the shore. If the teeth do not represent a curated item, and the shark was caught during the site occupation, the teeth could also indicate seasonality. Short-fin makos prefer water temperatures of about 60 degrees Fahrenheit and are commonly found in the waters off southern New England between July and late October. These seasonality estimates coincide with



the estimated fall occupation during the Terminal Archaic period, based on the recovery of hickory nuts and faunal (likely deer) remains from Feature 1.

Regardless of the method of procurement, shark teeth may have held a greater significance than mere proof of a successful hunt. Shark teeth have been found in numerous mortuary contexts in the Northeastern U.S. and Canada, including at sites in Massachusetts, Rhode Island, and Connecticut (Torrey and Bullen 1946; Taylor 1970; Handley 1996). Betts et al. (2012), who conducted a region-wide survey of shark teeth from the Late Archaic through the Late Woodland period on the Maritime Peninsula, suggests that shark teeth may have played a number of ritual and/or practical roles in ancient Native American society related to trade, fishing, identity, and cosmology. The presence of the shark teeth within the rhyolite concentrations of debitage in Blocks A and C, as well as the proximity to Features 1, 5, and 12, likely indicates that the teeth were procured or curated during the Terminal Archaic occupation of Locus 9. If so, these teeth may represent the only Terminal Archaic-period shark remains found to date in southern New England (see Handley 1996; Betts et al. 2012).

## Conclusions

Locus 9 remained dry and habitable throughout the pre-colonial period even with rising sea levels, and was inhabited by Native people during the Early, Middle, Late, and Terminal Archaic periods, as well as the Early and Late Woodland periods. Occupation of Locus 9 appears to have been most frequent during the Terminal Archaic and Late Woodland periods. In the Archaic period, the area would have been high and dry. It was surrounded by sources of food and fresh water and was located in proximity to waterways that could be used to traverse a larger territory or homeland. The Terminal Archaic occupation was likely contemporaneous with the Atlantic Phase occupation of Locus 10 (Rae and Jones 2017); based on the range of activities carried out, and the presence of early Vinette I-like pottery associated with the Terminal Archaic occupation, Locus 9 probably served as a living

area for the people involved in the specialized canoe building activities carried out at Locus 10. During the Woodland period, sea level rise would have led to marsh development proximate to Locus 9, which created an even more diverse suite of prey and plant foods, but restricted the extent of dry land. The excavations at Locus 9 produced evidence of cultural features, material culture, faunal and floral remains which suggest that the site inhabitants regularly moved between coastal, intertidal, and inland areas. Over thousands of years, the site was used repeatedly for temporary and longer-term visits, during which people hunted, collected, and processed plant, animal, aquatic, and lithic resources, likely in a small family group, rather than an aggregate population.

Overall, Locus 9 offers further evidence of mobile Native American life from the Middle Archaic to the Late Woodland in coastal and tidal river settings of southeastern Massachusetts. Visits to these coastal sites were likely driven by the abundant source of glacial beach cobbles for lithic raw material, a source known and used over millennia. Coastal or near-coastal marine foods were also a focus of site visits, reflected by sites with shell middens, as well as sites like Locus 9 with fishing equipment and fish and shark remains. The final attribute that cannot be overlooked is that many of these sites are in proximity not only to the coast but to marsh resources. Marsh systems are often cited as one of the most productive ecosystems on the planet, as they uniquely support a mixture of marine life, waterfowl, terrestrial mammals, and wetland and terrestrial plants. Seasonal migrations of birds and fish would augment a resource base already abundant with food, fuel, tools, and water. Therefore, these near-coastal sites would offer access not only to marine foods and transportation, but also to a wide variety of seasonally predictable resources from the marsh itself. In general, when placed within the broad regional framework, Locus 9 marks an important area for foraging and some longer-term activities that points to use over millennia by various transient groups intent on pursuing the bevy of surrounding resources with the latest technologies.

## Acknowledgements

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Figure 1: General Location of Site 19-PL-426 on USGS Duxbury Quadrangle, 1:24000.



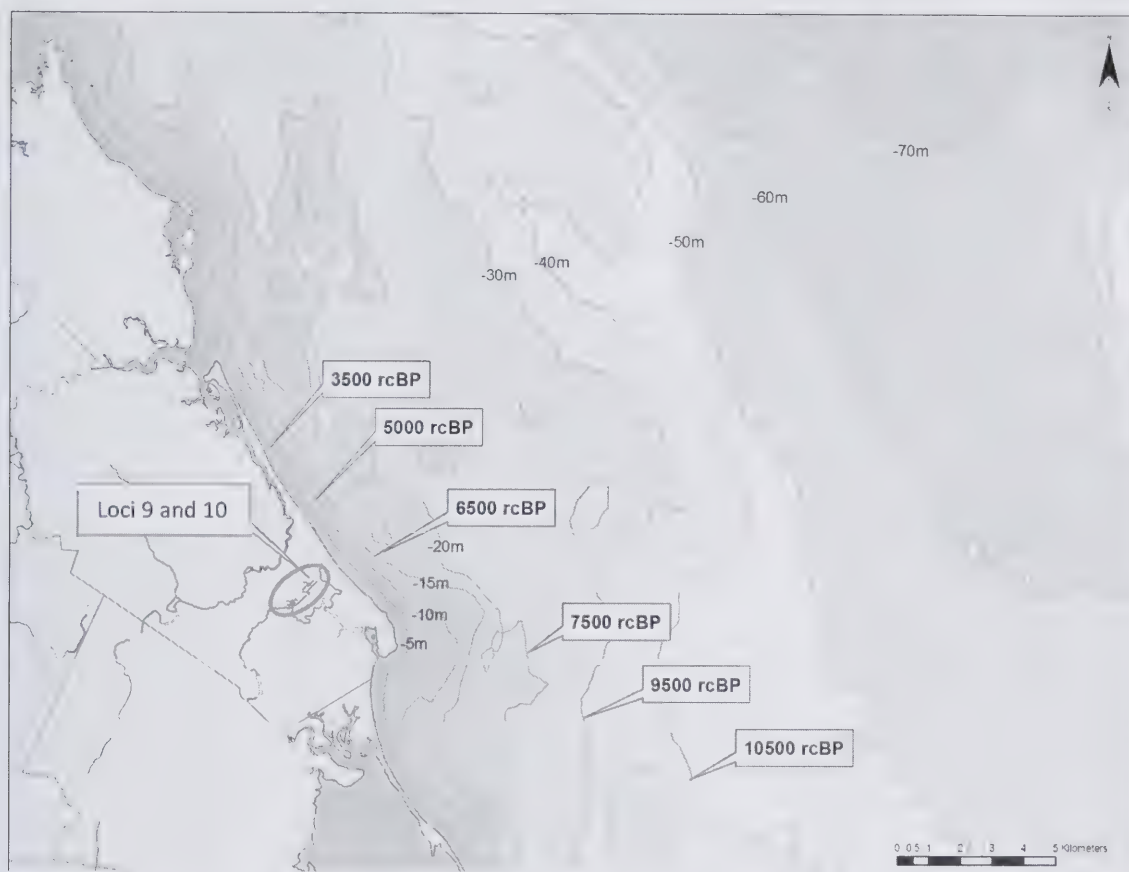


Figure 2: Offshore bathymetry of southeastern Massachusetts, showing projected ages of the ancient shore-line based on the sea-level data (bathymetry data from MassGIS). This data represents an approximation because of the complicating effects of irregular post-transgression sedimentation and erosion; i.e., modern sea-floor bathymetry is not an accurate reflection of ancient terrestrial topography.

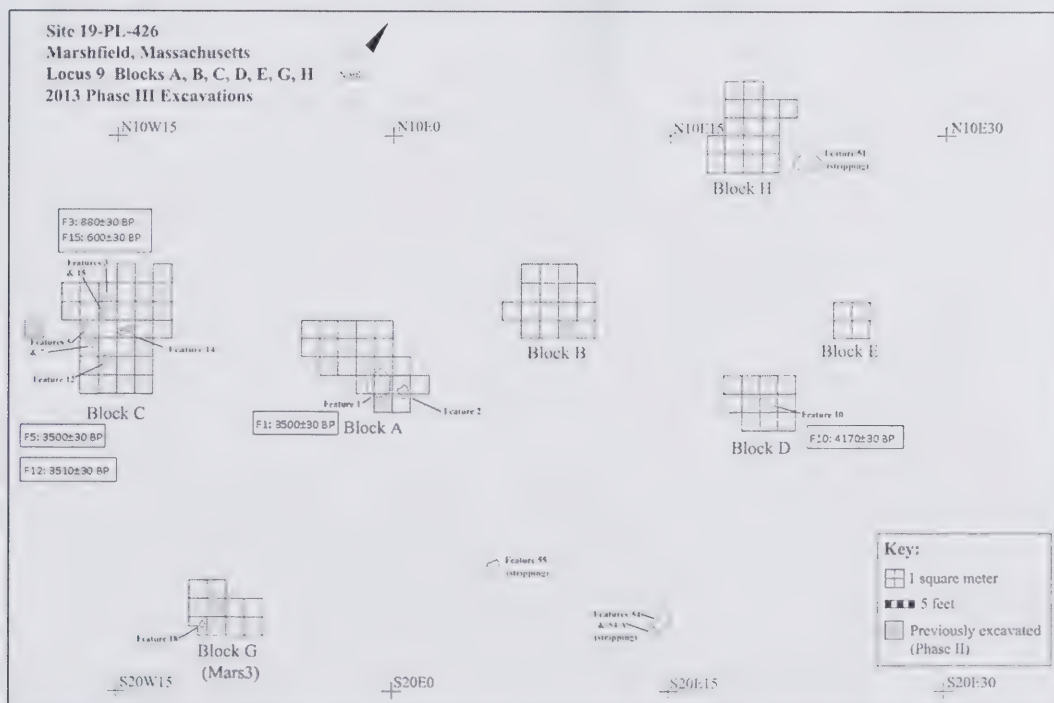


Figure 3: Plan of Locus 9 excavation Blocks A-H, showing the locations of identified cultural features. Radiocarbon dates are displayed as uncalibrated BP dates.

Type	Count
Utilized debitage	80
Retouched debitage	14
Bifaces	130
Preforms	18
Projectile points	83
Knives/flake knives	7
Drills/perforators	10
Scrapers	17
Choppers	5
Wedge	1
Groundstone tools	12
<b>Total</b>	<b>381</b>

Figure 4: Lithic tools from Locus 9 (DRP)

Feature	Block	Type	Period	Date
1	A	Small hearth	Terminal Archaic	3,500±30 BP (Beta #382483)
2	A	Possible pit	Unknown Pre-colonial	N/A
3	C	Small hearth	Late Woodland	880±30 BP (Beta #382485)
5	C	Two small pits or hearths	Terminal Archaic	3,500±30 BP (Beta#382486)
7	C	Unknown	Unknown	N/A
10	D	Small hearth	Late Archaic	4,180±30 BP (Beta #382488)
12	C	Post mold	Terminal Archaic	3,510±30 BP (Beta #382487)
14	C	Unknown	Unknown Pre-colonial	N/A
15	C	Possible pit	Late Woodland	600±30 BP (Beta#382484)
18	G	Post mold	Unknown Historic	N/A
51	Stripping	Unknown	Unknown	N/A
54	Stripping	Unknown	Unknown Pre-colonial	N/A
55	Stripping	Unknown	Unknown Pre-colonial	N/A

Figure 5: Summary of cultural features and calibrated radiocarbon dates from Locus 9

Type	Period	Count
Possible bifurcate	Early Archaic	1
Merrimack	Middle Archaic	1
Burwell (after Lavin Russell 1985)	Middle Archaic-Late Archaic	1
Possible Burwell	Middle Archaic-Late Archaic	4
Snappit-like	Middle Archaic	1
Brewerton Side-Notched	Late Archaic	2
Squibnocket stemmed	Late Archaic	5
Squibnocket Triangle	Late Archaic	6
Possible Squibnocket triangle	Late Archaic	1
Vosburg	Late Archaic	1
Wading River	Late Archaic	5
Possible Wading River	Late Archaic	2
Untyped Small Stemmed	Late Archaic-Early Woodland	7
Atlantic	Terminal Archaic	1
Possible Atlantic	Terminal Archaic	1
Orient Fishtail	Terminal Archaic	1
Wayland Notched- Coburn	Terminal Archaic	4
Wayland Notched- Dudley	Terminal Archaic	1
Meadowood	Early Woodland	1
Rossville	Early Woodland	8
Possible Rossville/Rossville-like	Early Woodland	8
Levanna	Late Woodland	1
Possible Madison	Late Woodland	1
Untyped fragments	N/A	19
<b>Total</b>		<b>83</b>

Figure 6: Diagnostic projectile points from Locus 9



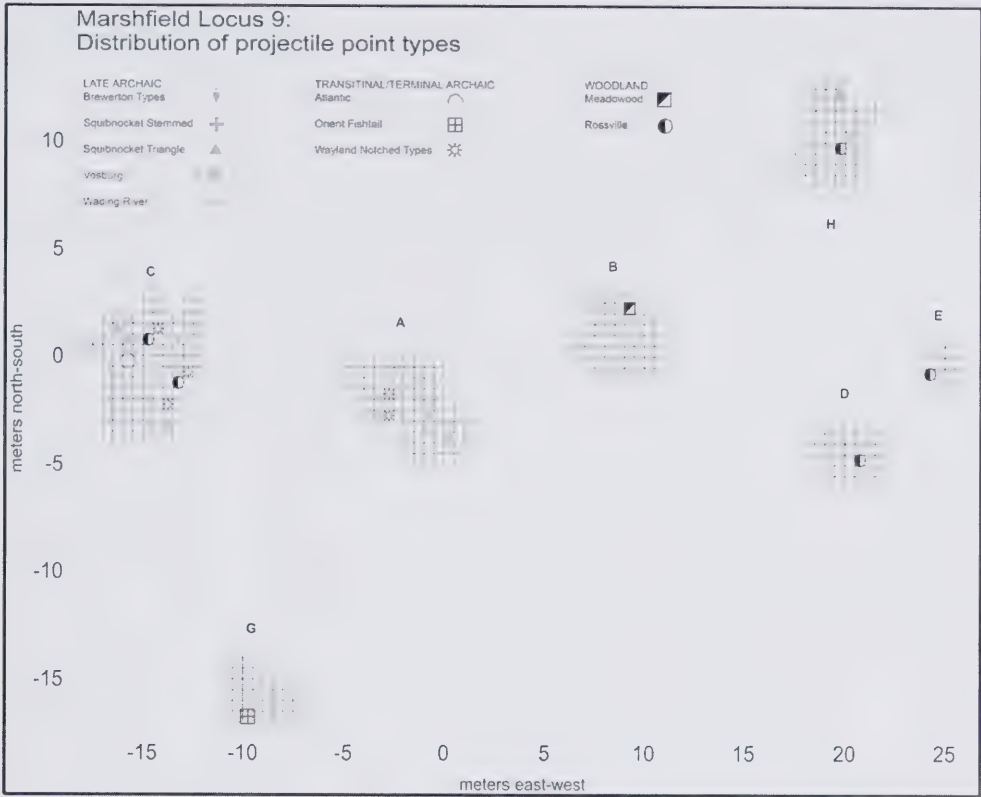


Figure 7: Distribution of projectile points from Locus 9.

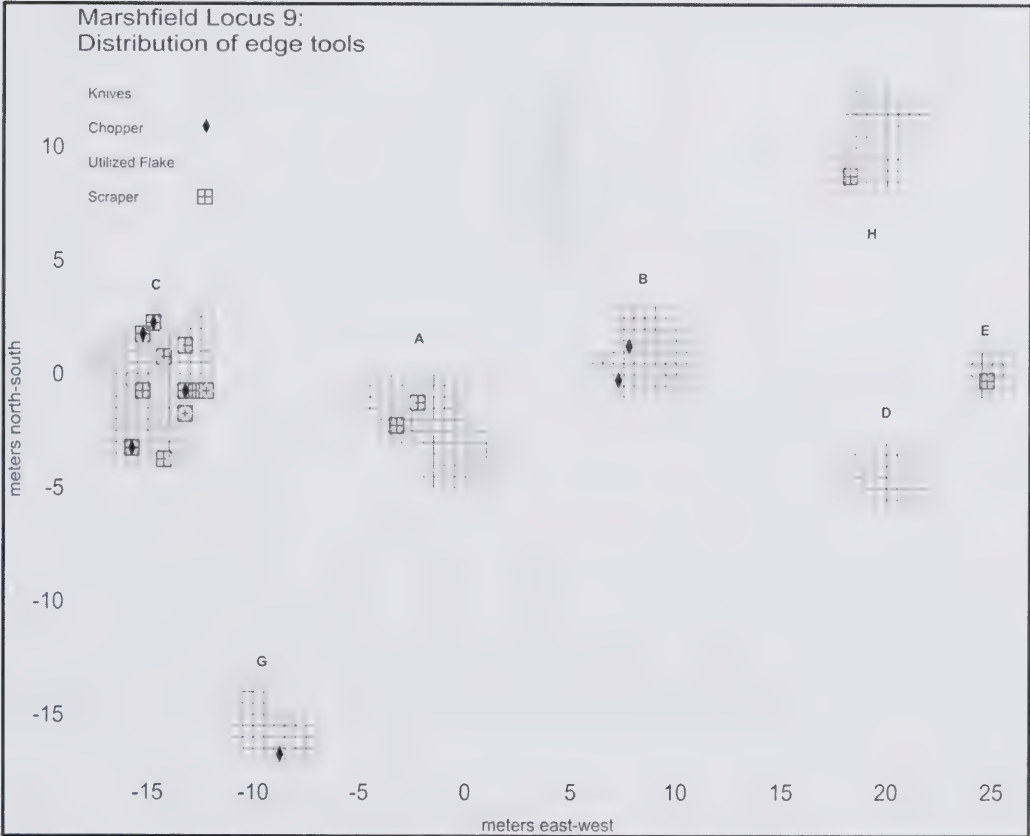


Figure 8: Distribution of edge tools from Locus 9.

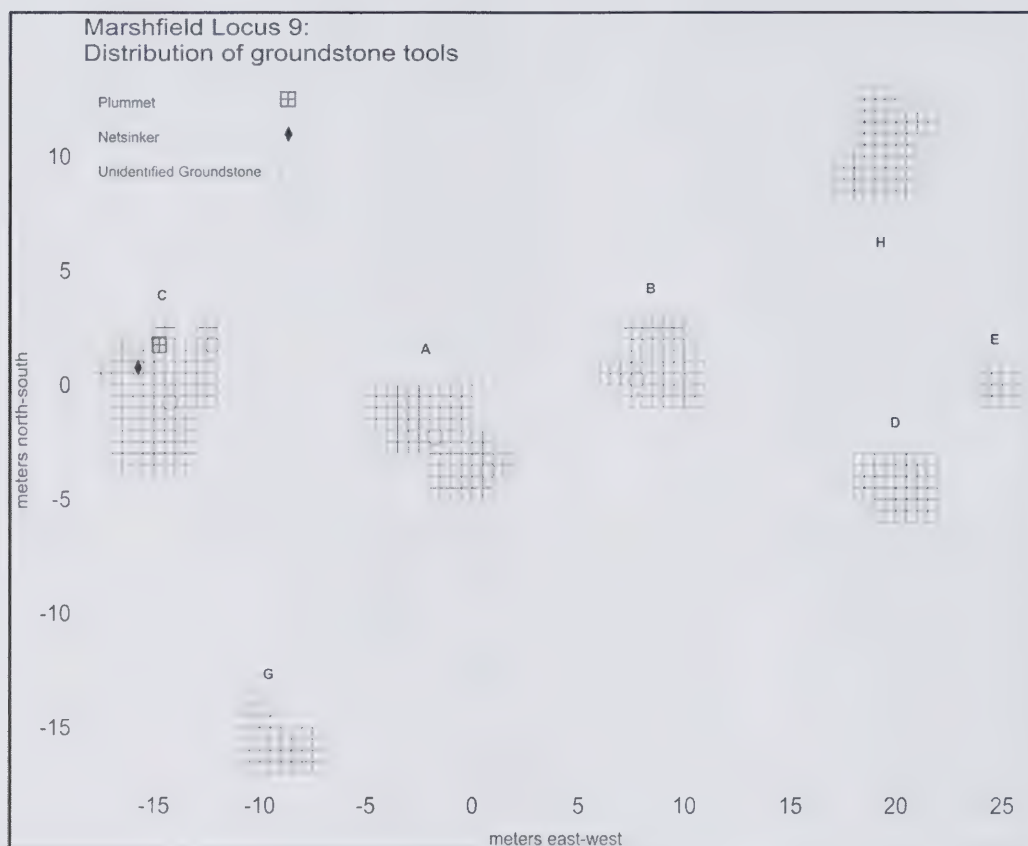


Figure 9: Distribution of groundstone tools from Locus 9

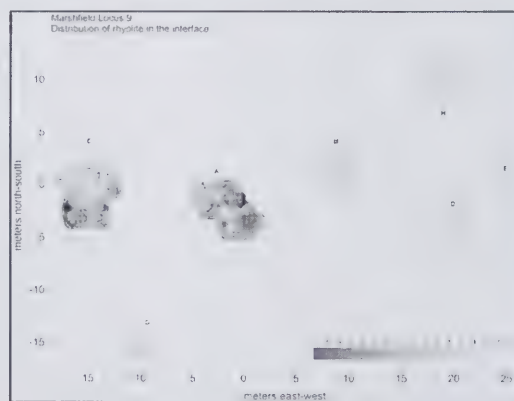
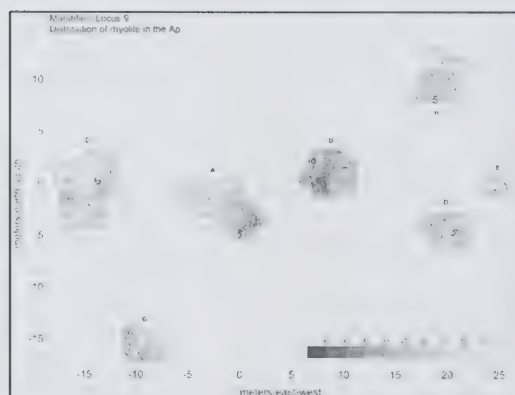


Figure 10. Distribution of rhyolite artifacts in Locus 9.



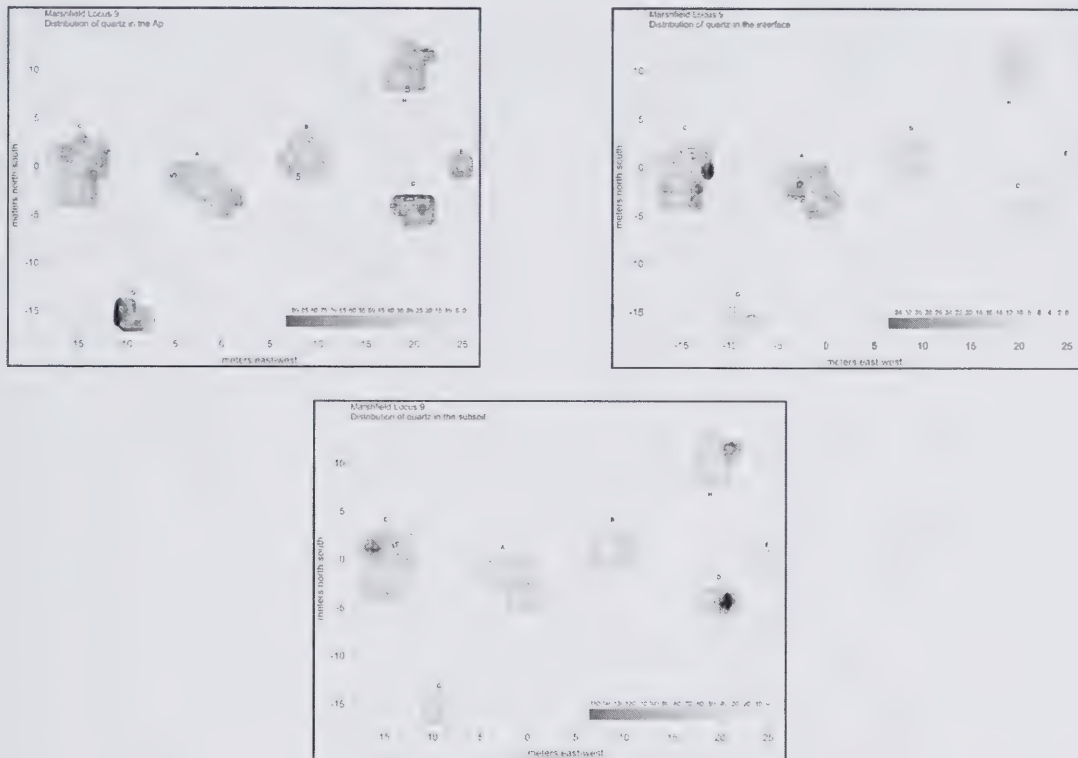


Figure 11. Distribution of quartz artifacts in Locus 9.

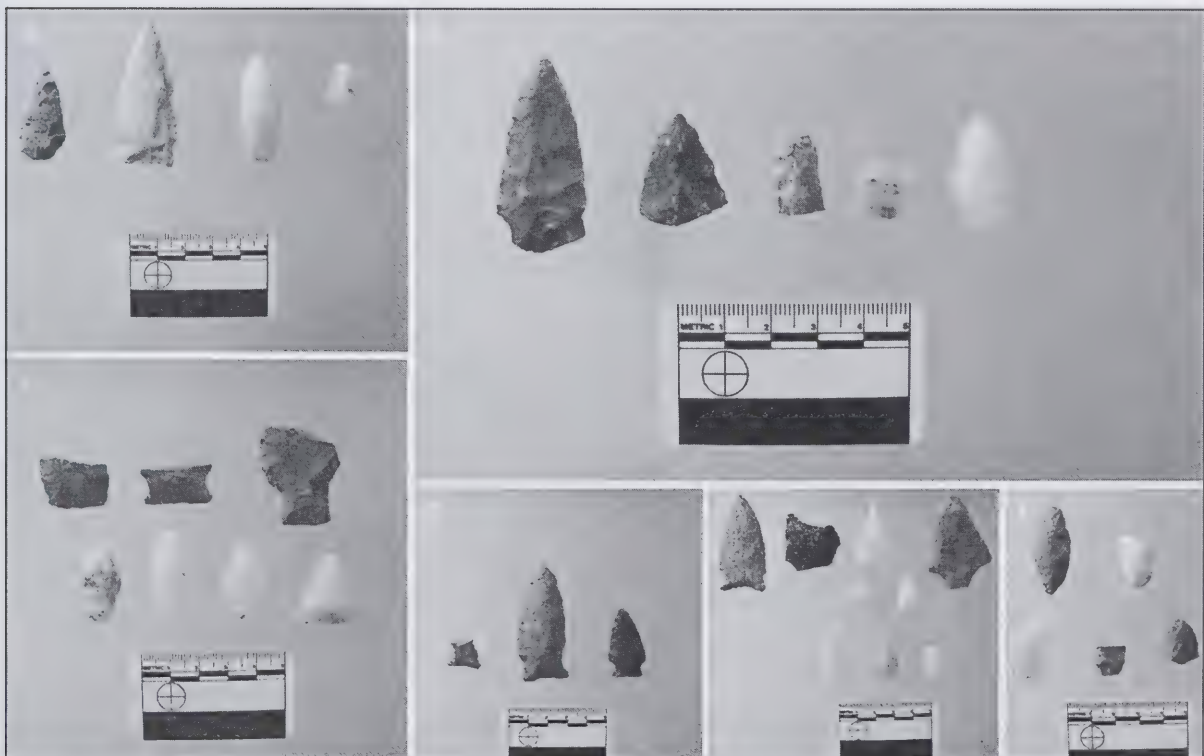


Figure 12: A selection of projectile points from Locus 9. Left to right. A- Block E: possible Bifurcate, Brewerton side notched, Rossville, untyped Small-Stemmed; B- Block B: Meadowood, untyped, drill tip, untyped Small-Stemmed, Wading River; C- Block A: Atlantic, Wayland Notched (2), Rossville, Squibnocket Stemmed (2), Squibnocket Triangle; D- Block C: Wayland Notched (3); E- Block C: Brewerton side notched, Atlantic, Snappit, Atlantic, Burwell (5); F- Block D: Rossville (2) Wading River, untyped Small-Stemmed, untyped.



Figure 13: A selection of flaked tools, including scrapers (top left), bifaces (bottom left), drills/perforators (center), choppers (top right), and a wedge (bottom right).

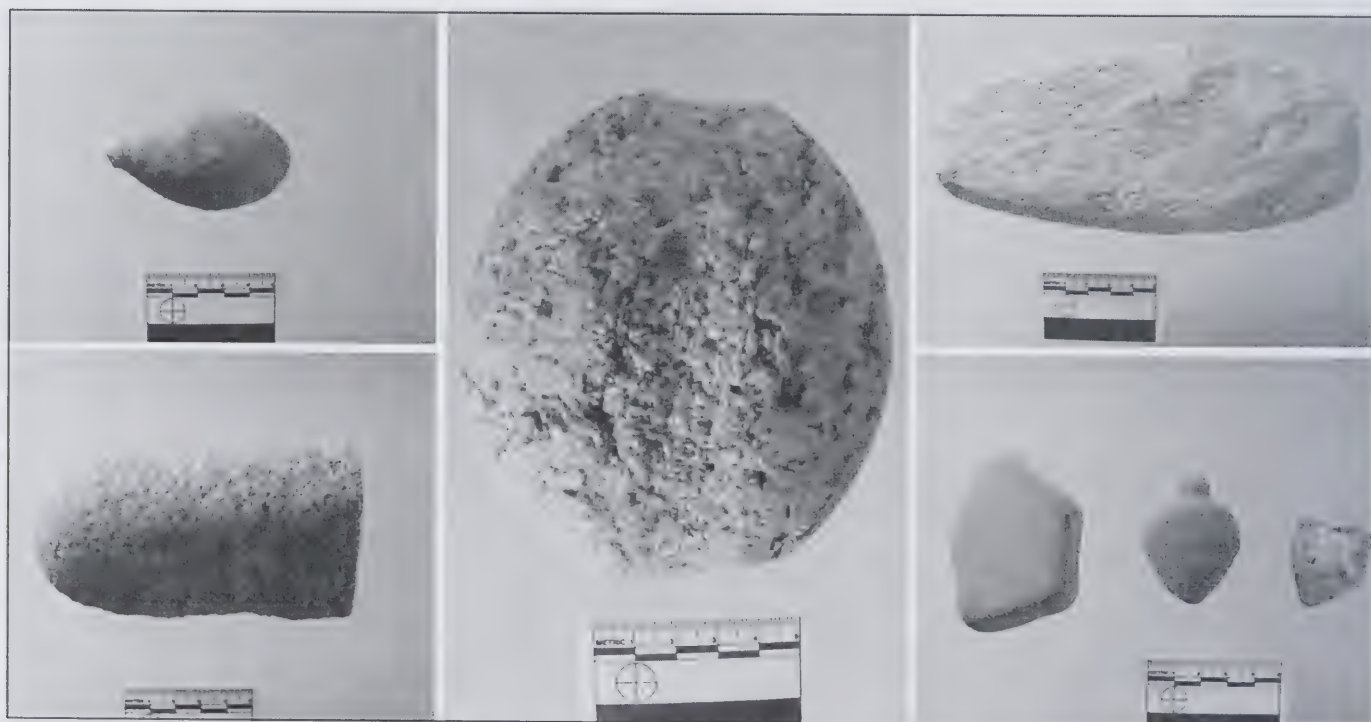


Figure 14: A selection of groundstone tools from Locus 9 (plummet – top left and bottom right; net sinker – center; adze blank – top right; and pestle – bottom left).



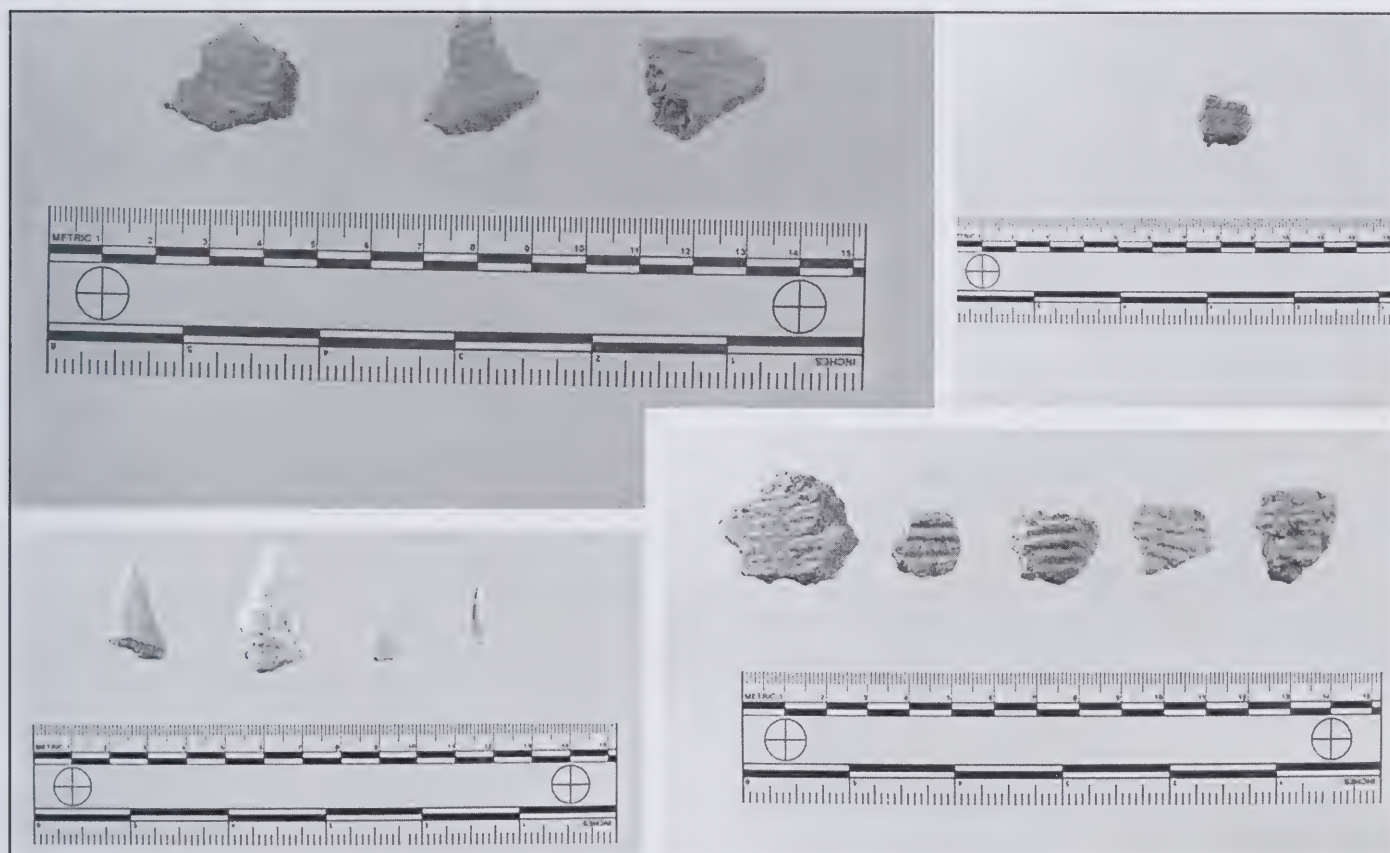


Figure 15: A selection of Terminal Archaic (bottom right and top right [Vinette 1-like]) and Late Woodland (top left) ceramics, as well as Mako Shark teeth (bottom left).

## Ancient Pottery from Cape Ann, Essex, and Ipswich, Massachusetts

Mary Ellen Lepionka

Ceramic sequences for New England vary regionally, with regionalization in the Middle Woodland Period (Peterson 1980, Bragdon 1999), greatest variability in the Late Woodland Period (Luedtke 1986), and the introduction of Anglo-European redware in Contact Period sites (e.g., Goodby et al. 2014). Examples of regionalization in Middle Woodland ceramic traditions (A.D.500-1000) include the Melocheville tradition in southern Quebec, the Princess Point Complex in southern Ontario, the Winooski sites in northwestern Vermont, and neighboring sites in New York State and northern New England (St-Pierre 2001).

Regional typological sequences have been variously established for southern New England (Howes 1943, Fowler 1960), especially Cape Cod and Connecticut (Lavin 1997, Figure 1); northern New England (Petersen and Sanger 1991); New York (Ritchie and MacNeish 1949, Lizée 1994), and southeastern Canada (e.g., St-Pierre). There may be significant overlap, nevertheless. Some attributes of Quebec's Melocheville ceramic tradition, such as stick-incised and punctate motifs, appear to be present in some Ipswich, MA potsherds, for example (Figure 2).

The typological sequences have been subject to debate, periodic reexamination, and attempts to reconcile terminology (e.g., Lizee 1994, Goodby 2002, Wolf 2013), but perhaps some generalizations can safely be made. Transition from Late Archaic to Late Woodland pottery is generally evidenced by shifts from fiber- and grit-tempered to mica- and quartz-tempered to shell-tempered wares, with increasing decorative elaboration and decreasing wall thicknesses, except in vessels for boiling vegetables in large quantities of water (Dincauze 1975, Kenyon 1986, Robinson and Bolian 1987, Chilton and Hardy 2014). Earlier wares are lighter in color and more friable, reflecting a method of firing in open air at lower temperatures; later wares are darker in color and harder, suggesting more oven-like firing with higher heat and less exposure to oxygen.

These changes appear to obtain universally in the Northeast, and also share characteristics with ceramic traditions in the Midwest and Southeast. Stylistic changes likewise seem to show widely diffused and long-standing methods and motifs that nevertheless appear in most chronologies as progressive and diagnostic: scallop-shell impressed, cord impressed, and circular punctate in the Late Archaic and Early Woodland; fabric-impressed, cord impressed, and fingernail incised in the Middle Woodland; and cord-wrapped stick-whipped, dentate stamped, rocker stamped, zonal-incised, and castellated punctate in the Late Woodland.

Some researchers have attempted to link stylistic differences with the emergence of ethnic or tribal identities, and to link the spread of distinctive styles through band exogamy in patrilocal kinship systems or patterns of trade on major river systems (Luedtke 1986, Goodby 1988). According to one researcher: "By studying these variations within and between sites, it is possible to determine band and regional identities among people living in the Northeast prior to European contact and then use this information to trace population movements and trade relationships between different groups" (Wolf 2013: 2). Others have linked stylistic differences to stable local groups of potters rather than to population movements (Kenyon 1986).

However, decorative styles also appear to be cumulative in the human repertoire, such that mate-

rials and designs common in Early Woodland ceramics can also be found to have carried over even to Late Woodland samples. Examples may be seen in potsherds from a pre-Contact New Hampshire fish dam site, with banded, punctate, and zonal-incised motifs that resemble samples from coastal Essex County in Massachusetts (Figure 3, Goodby et al. 2014).

Woodland Period coastal sites on Boston's North Shore have yielded mostly plain shell-tempered sherds with modestly incised rims in local red and yellow clays (Greenly 1999), similar to those found in Boston Bay (Figure 4, Edens and Kingsley 1998). The North Shore is rich in thick deposits of glacial marine clays that are red-brown, red-grey, blue-grey, yellow-brown, and yellow-grey in color, in silts containing a great variety of mineral grains and microscopic cold-water fossils (Wall et al. 2004). These deposits—in Andover, Danvers, Salem, Middleton, Peabody, Newburyport, and Saugus—supported a seventeenth century colonial clay industry following a thousand years or more of use by Native Americans. Salem Village was established near the Pawtucket village of Naumkeag, and the first recorded brick kiln was built in Salem in 1629 near Salem Willows (Wall et al. 2004).

On Cape Ann, Native people and colonists dug clays at Clay Pit Landing in the Jones River, for example, and from beaches in Annisquam and Manchester-by-the-Sea. Great quantities of potsherds from Riverview, Rust Island, and Merchants (Pearce) Island in Gloucester were reported by Frank Speck and Frederick Johnson in the 1920s, according to site cards in the R. S. Peabody Museum in Andover, MA (Lepionka 2013). Working from their notes, amateur archaeologist N. Carleton Philips gathered "bushel baskets full of broken Indian pottery" from those sites and from Hog Island in Ipswich (Phillips 1940). A few examples of Woodland pieces of uncertain local provenience are stored in the Phillips Collection at the Cape Ann Museum in Gloucester.

Potsherds from Essex Falls (Figure 5), collected by Eugene Winter, are stored at the R.S. Peabody Museum in Andover. The Winter Collection contains 111 sherds that can be divided into three groups based on stratigraphy and Winter's inventory



notes (Winter 1965). In the first group (earliest) the few pieces large enough to indicate pot diameter suggest large pots of a type used more in food storage than in cooking or portage. Rim pieces are absent. The walls are thick and made of yellow clay with very smooth gray temper. These pieces appear to be Early to Middle Woodland in thickness, temper, and style. The second group features shell-tempered sherds, 0.5 cm to 1.0 cm thick, fired at low temperatures with exposure to air, with evidence the pots were stick-whipped on the interior walls. Rim and neck decorations are stick- or fingernail-incised, with vertical lines drawn between horizontal bands (as shown in Figure 3C) and diagonal dentate band marking. Body decoration includes horizontal trailing jabs made with a stick. These sherds appear to be Middle to Late Woodland. The third group mixes Late Woodland potsherds with unglazed and glazed redware clearly dating to the Contact Period, found in association with iron nails. These sherds are of thick, friable redware with coarse temper, some with transparent interior lead glaze, suggesting use as containers for fats, oils, pigments, or dyes.

The Matz Collection from a Contact Period site on Atlantic Road in Gloucester also features a combination of redware and cord-wrapped quartz-tempered body sherds (Keller 1965, Figure 6). Robert Matz of Gloucester reported he worked in N. Carleton Phillips' excavations in 1940 as a young child. The Matz Site (969-45-10) contained both European and Native artifacts, including ceramic beads, stone projectile points, square iron nails, glass shards, shell and brass buttons, musket flints, fragments of white kaolin clay pipes, lead-glazed redware, glazed painted china, hearth stones, and utilized chert and flint flakes. The Gloucester and Ipswich Pawtucket received muskets by 1638, if not before, and it is recorded that the local sagamore's wife was given a piece of English china like that represented in the Matz collection (50148) (Keller 1965). The time depth of this collection was not recorded, however; nor was there a determination of whether the artifacts came from one or more English or Pawtucket living floors, or both in succession.

One distinctive type of sherd may have belonged to the same pot: a large, thick, lightly interior-glazed, yellow, grit-tempered pot that would have been useful for tasks involving both thermal and mechanical stress, such as long-term cooking with water over an open fire. These pieces are about 0.75 cm in thickness, are consistent in manufacture and color, which include examples of redware as well. Pre-contact pottery seems to be represented by a single large, quartz-tempered, body sherd (50195) of Middle Woodland age, about 0.50 cm. in thickness, with both interior and exterior markings. The interior appears to have been stick-whipped and the exterior decoratively fabric-stamped. Lack of curvature suggests a fairly large pot, which seems adapted for tasks involving mechanical stress, such as portability and storage. The Matz Collection is housed in Harvard's Peabody Museum in Cambridge.

In 2015 when photo-documenting artifacts in the Harvard Peabody Museum's collections from Cape Ann, I was also shown a variety of sherds and partial pot reconstructions from pieces collected in the early 1900s from unidentified village sites in Ipswich. Information about provenance was not available at the time, and I do not know if or when the material had the benefit of lab analysis. Certainly further investigation is warranted. The pieces appear to reflect the full range of Early to Late Woodland New England decorative styles in a similar clay, fired red (Figures 7-13). Overall, the design motifs resemble finds from Seabrook sites (Robinson and Bolian 1987, Goodby 1995), the Hunt's Island site on Hampton Harbor (Greenly 1999), and the Clark's Pond site in Ipswich (Bullen 1949, Greenly 2004), suggesting some cultural continuity, if not exclusively regional distinctiveness, among people of the seacoast and coastal plain of the Northeast, as borne out by lithic evidence as well (Chilton and Hardy 2014). However, this continuity in ceramic materials and styles seems to extend beyond New England to the Canadian Maritimes and the Middle Atlantic, matching the distribution of Late Woodland Algonquians on the eastern seaboard.

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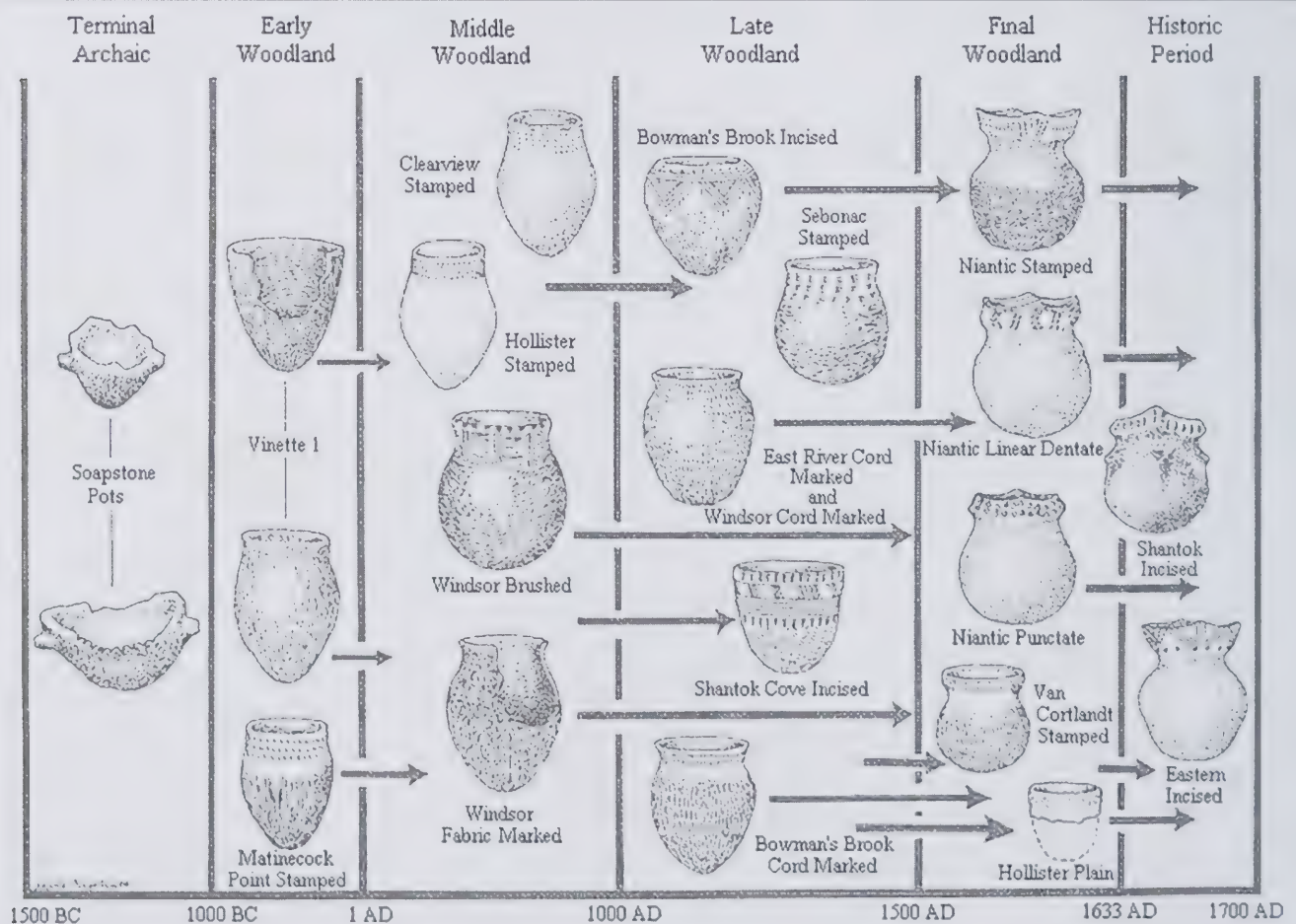


Figure 1: Lavin's vessel sequence for Connecticut (1997)



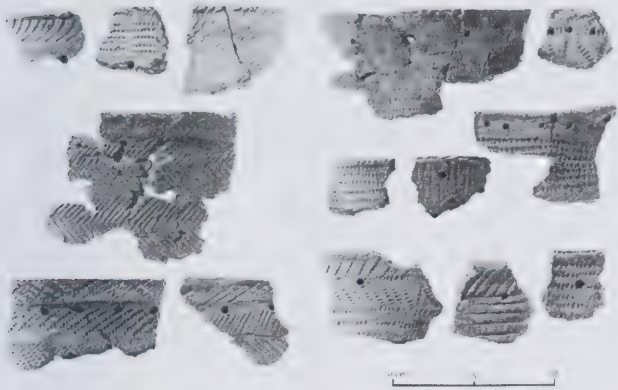


Figure 2: Ceramics from Melocheville, Pointe-du-Buisson, Quebec

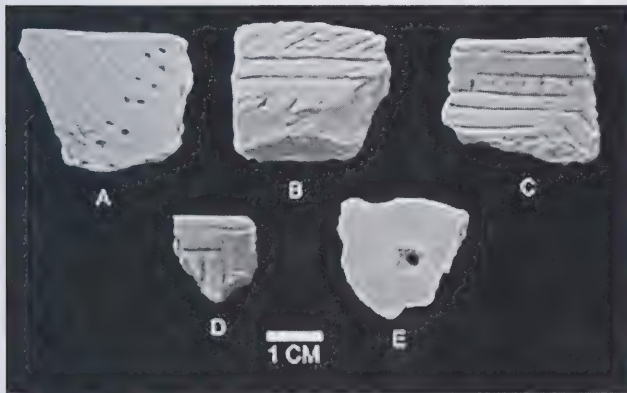


Figure 3: Ceramics from the Swanzy Fish Dam on the Ashuelot River in New Hampshire (Goodby, Tremblay, and Bouras 2014)



Figure 4: Shell-tempered sherd from Spectacle Island in Boston Harbor (Edens and Kingsley 1998)



Figure 5: Cord-impressed quartz-tempered sherd from the Matz Collection



Figure 6: Fingernail, dentate, and punctate motifs in the Winter collection



Figure 7: Cord-impressed, trailing dentate, and punctate motifs in Harvard's Ipswich collection.

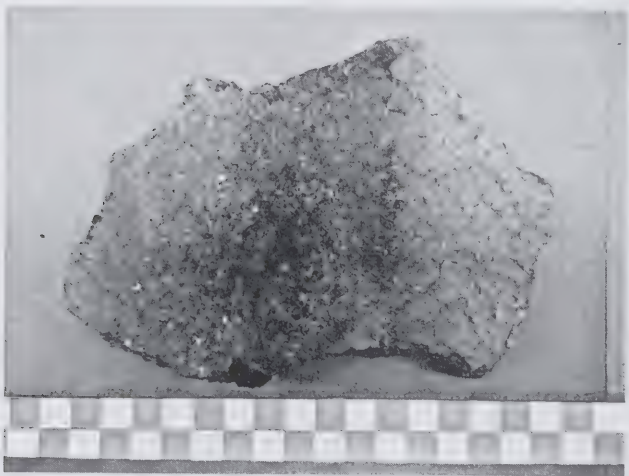


Figure 8: Fabric-impressed mica-tempered sherd in Harvard's Ipswich collection

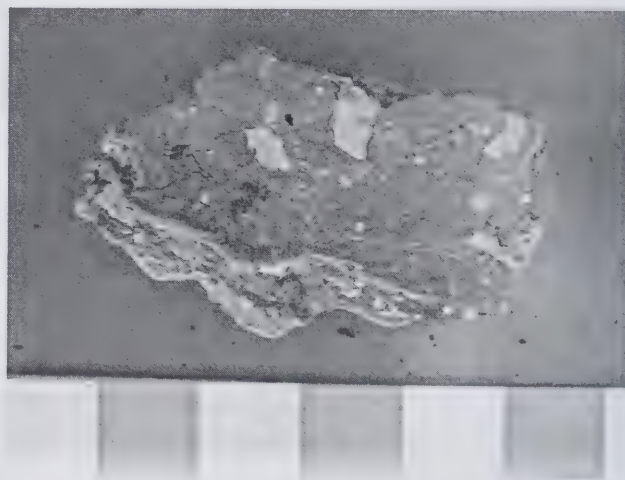


Figure 9: Thick quartz-tempered sherd in Harvard's Ipswich collection



Figure 10: Assorted stick-impressed, dentate, and punctate sherds in Harvard's Ipswich collection



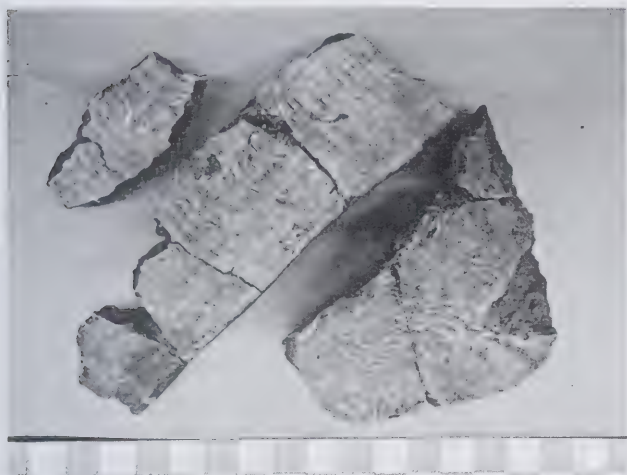


Figure 11: Stick-incised rocker-stamped rim and body sherds in Harvard's Ipswich collection

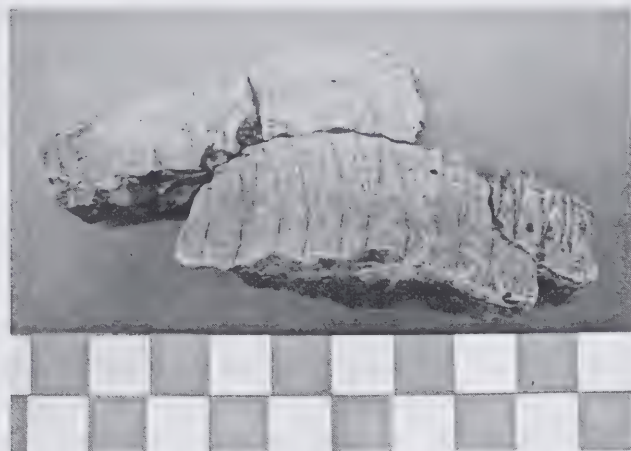


Figure 12: Rocker-stamped sherds in Harvard's Ipswich collection



Figure 13: Zonal-incised motifs in Harvard's Ipswich collection

## Stone Rods from the Middleborough Little League Site

Curtiss Hoffman and Joseph Mitchell

### Description of the Problem

Over the past 22 years, excavations at the Middleborough Little League Site (19-PL-520) have been documented in numerous Bulletin articles (Hoffman 2004a, 2009, 2016b, 2018) and in excavation reports submitted to the Massachusetts Historical Commission (Hoffman 2000, 2001, 2004b, 2007, 2011, 2012, 2015, 2016a, 2017). Excavations have been undertaken as a field school by students from Bridgewater State University and MAS volunteers, under the supervision of the senior author. The junior author has participated as a volunteer during the 2017 and 2018 field seasons. The site was a locus for intensive Native American ceremonial activity from the Middle Archaic to Late Woodland periods, as evidenced by large quantities of red, black, and yellow pigment stones (hematite, graphite, and limonite, respectively), quartz crystals (including twelve biterminated Herkimer diamonds), polished pebbles, and one-hole pendants.

Already in the 1998 intensive survey on the highest, third terrace at the site, an additional unusual artifact type was noted: a cylindrical rod of a soft greenish-grey stone 12 mm in length, 11 mm in width and thickness. At that time, the material was identified as argillite, which is the local bedrock (Hartshorn 1960). Twelve additional rods, eleven of the same material and one of grey quartzite, were recovered during the 1999 – 2001 data recovery operation and the 2006-2008 site examination operation in this portion of the site (see Figure 1). The quartzite rod had proportions nearly identical to those of the original find, while the other rods were considerably longer (range = 19.1 – 91.0 mm; average = 47.82 mm) and wider (range = 6.2 – 26.0 mm; average = 15.52 mm), while the thickness of most rods was similar to that of the original specimen (range = 5.0 – 16.0 mm; average = 9.12 mm). As grains, all of the rods found at the Little League Site can be characterized as largely cylindrical, very rounded, with extremely low sphericity.

While eight of the rods derived from feature contexts, only two of these features contained sufficient charcoal for radiocarbon dates. Feature #69.1, a burnt rock platform, returned a date of 2990±70 B.P. (GX-27261; cal 3322 3076 bp) (<http://www.calpal-online.de/cgi-bin/quickcal.pl>). The rod was in Feature #69.2, a deep red earth pit beneath Feature #69.1. Feature #96.1, an ash lens above a burnt rock platform, yielded a date of 2220±100 B.P. (GX-32751; cal 2121 2342 bp) (<http://www.calpal-online.de/cgi-bin/quickcal.pl>). One rod was located in Feature #96.2, a deep red earth pit beneath Feature #96.1. An additional rod was recovered from Feature #96.5, part of the same feature complex but one meter away. Two of the rods were from the plow zone. The remaining two rods were from the subsoil but were outside features.

Subsequent excavations on the lowest, first terrace at the site from 2009 – 2014, at the intensive survey and site examination levels, recovered a total of sixteen rods, all but one of the same greenish-grey stone (the exception, again, was of quartzite) (see Figure 2). The lengths of these rods ranged from 15.2 mm to 54.15 mm (average = 32.08 mm); their widths ranged from 4.4 mm to 15.6 mm (average = 10.22 mm); their thicknesses ranged from 5.2 mm to 10.8 mm (average = 7.18 mm). Six of the rods were found in features (including four from the same feature); four were from the plow zone; four were in the underlying C zone, one was from non-feature subsoil; and one was from the balk. None of the features was associated with enough charcoal for a radiocarbon date.

In 2015 -2016, excavation commenced on the narrow band of the second terrace which is all that remains after construction of playing fields at the site, at the intensive survey level of investigation. Twenty-nine 50 cm x 50 cm test pits were excavated using a staggered systematic grid pattern at 10 m intervals along transects 5 m apart (Krakker, Shott, and Welch 1983). During this phase of investigation, an additional twenty rods were recovered, all of the same greenish-grey material (see



Figures 3 and 4). The lengths of these rods ranged from 11.7 mm to 48.4 mm (average = 26.02 mm); their widths ranged from 4.4 mm to 15.3 mm (average = 8.79 mm); their thicknesses ranged from 1.4 mm to 10.0 mm (average = 5.94 mm). Eleven of these rods were found in features; four were in the plow zone, one was from the C zone; two were in fill zones; and one was in the balk. As on Terrace 1, none of the rods derived from dated features.

In 2017, the initial phase of a site examination was undertaken in units containing features randomly selected by feature number from among the twenty-three identified in the intensive survey. Eleven of the original 50 cm x 50 cm test pits were expanded to 1 m x 1 m units. The 2017 operation recovered 26 rods, all but two of the same greenish-grey material (the exceptions were single examples of felsite and granodiorite) (see Figure 5). The lengths of these rods ranged from 15.0 mm to 64.2 mm (average = 26.27 mm); their widths ranged from 2.9 mm to 21.1 mm (average = 7.4 mm); their thicknesses ranged from 2.2 mm to 14.2 mm (average = 4.95 mm). The granodiorite example was clearly an outlier, with the largest measurements in all three dimensions. The felsite rod was also at the upper end of the range for length (50.6 mm), width (12.9 mm), and thickness (11.3 mm). The rods with the next largest dimensions were at length 41.2 mm; width 8.4 mm, and thickness 6.8 mm – considerably narrower and thinner than those found in previous seasons.

Seventeen of these rods were recovered from features (including fifteen from the same feature, Feature #229, which had also yielded one rod during the 2015 season); six were from the plow zone (two of these were from the plow zone above Feature #229), two were from non-feature soils adjacent to a feature; and one was from the fill zone. Five of these units, including the unit containing Feature #229, were not completed at the close of the 2017 field season, so we looked forward to their completion in 2018. Once again, none of these features produced enough charcoal for a radiocarbon date. The one rod found in the fill zone was from the same unit which produced the equivocal radiocarbon dates discussed in my article in the Spring 2018 issue of the *Bulletin*; however, the fill most probably derived from the creation of a roadway through the terrace during 1996, so it is not likely

to be associated with those dates. The two rods from the non-feature subsoil were adjacent to a hearth feature dated to 1940±130 B.P. (GX-124064) (cal 1899±159 b.p.; 68% range 1739 – 2058 b.p.) (<http://www.calpal-online.de/cgi-bin/quickcal.pl>); but as they were not within the feature fill it is not possible confidently to associate them with that feature.

The 2018 phase of the site examination completed four of the five 1 m x 1 m units not completed at the close of the 2017 season; opened two additional 50 cm x 50 cm units to 1 m x 1 m units; expanded four of the 2017 units using 50 cm x 1 m trenches; and explored four new 50 cm x 50 cm test units. While readers will note an ascending trend in the number of rods recovered from season to season and from terrace to terrace, nothing prepared us for the veritable explosion in the number of rods recovered in 2018: a total of 2,003 rods, all of the same material as the original rod (see Figure 6). As excavators in 2017 had begun to observe much smaller rods than previously, the 2018 field crew was instructed to save all cylindrical stones of this material, and this at least in part accounted for the vast increase in numbers.

However, as shown in Figure 7, there was a continuous distribution of lengths and widths throughout the sample, so it is not possible to eliminate any of the rods smaller than a particular length or width. Lengths varied from 2.8 mm – 89.7 mm (average = 13.34 mm); widths from 1.15 mm – 29.6 mm (average = 4.88 mm); thicknesses from 0.6 mm – 12.9 mm (average = 3.25 mm). It is likely that some rods on the smaller end of these ranges were simply overlooked in previous seasons. However, some units were clearly more productive of rods than others, as Figures 8 and 9 show. Both figures combine the recoveries from 2015-2018. It should be noted that eight of the units containing the features enumerated in Figure 8 were not completed at the conclusion of the 2018 season, so the actual totals are expected to rise once these units are completed in 2019. These features are marked with asterisks in the leftmost column of Figure 11.

It should be noted that, with the exception of twenty rods recovered from two of the 50 cm x 50 cm test squares excavated in 2018, no rods were recovered from Terrace 2 units which lacked features,

even though there were six units lacking features in the intensive survey. They were also absent from four of the intensive survey test units which did contain features, but which were not expanded in the site examination. An additional five intensive survey units containing features had fewer than ten rods, including two which were expanded to 1 m x 1 m squares in 2017. The average for the 21.0 square meters excavated is 96.9 per square meter. Four of the units, containing Features #216, #221, #229, and #230, contained 79.5% of all of the rods from Terrace 2, 1,622 in all; and one of the expansion units, a 1 m x 50 cm trench in N11E29 to explore Feature #221, contained 37.5% of them (766 rods). A single 5 cm depth level in this unit, at 45-50 cm below the plow zone, produced 98 rods (see Figure 10). The radiocarbon dates reported in the last issue of the *Bulletin* derived from the same level of this feature, and one of them, at 3530±160 B.P. (GX-124268; cal 3843 bp) (<http://www.calpal-online.de/cgi-bin/quickcal.pl>), overlaps the date from Feature #69.1 on the Third Terrace at 2σ. A Susquehanna Broad point was recovered from the balk of the unit containing Feature #230, further suggesting a Transitional Archaic age for the rods.

A total of 70.7% of the rods derived from feature (B2) soils – not entirely surprising, given that the focus of the site examination was on units containing features – and an additional 16.1% were in the underlying C zone. The percentages for other soil horizons – fill, plow zone (A3), non-feature subsoil (B1), and balks – were much lower, as shown in Figure 11. By depth, as shown in Figure 12, there were distributional spikes from 40 – 60 cm below surface and from 75- 90 cm below surface. This is similar to the situation described for Terrace 1, in which all ceremonial objects tended to be found in the lowest levels of features, suggesting deliberate placement, perhaps as offerings (Hoffman 2017). Vadala (2018) has recently suggested that caches may be distinguished archaeologically from hoards deposited for later retrieval, on the basis of their content; if the content is primarily related to ceremonialism, he concludes that they are offerings.

A Spearman Rank-Order test comparing the distribution of rods on Terrace 2 with those of paintstones and polished pebbles by 5 cm depth level gave values of 0.487 and 0.648, respectively (see

Figure 13). These values are significant at the 0.05 and 0.02 confidence intervals, respectively, indicating that the placement of the rods in features was similar to that of the other types of ceremonial goods. By contrast, a Spearman Rank-Order test comparing the vertical distribution of rods with that of chipped stone tools gave a value of .415, which is only significant at the 0.10 confidence interval.

Furthermore, an investigation of the ratios of length to width, length to thickness, and width to thickness for all rods showed strong centralizing tendencies around the mean for all three ratios, irrespective of the rods' actual size, as shown in Figures 14 -16. The sphericity of the rods (calculated by dividing the sum of length and width by twice the thickness; see Rodriguez et al. 2013) varied between 0.23 and 11.58, but it was also strongly clustered about the mean of 2.97. This suggests that there was deliberate choice involved in stones used for rods, no matter at what scale.

### Comparisons with Other Sites

Stone rods are sparsely documented in the archaeological literature of the Northeast. Large rods appear to be one of the characteristic traits of the Middle to Late Archaic Moorehead complex in northern New England (Petersen and Putnam 1992:34,42; Robinson 1992:88-92; Sanger et al. 1992:153-154). These are described as being made of “metamorphics that range continuously from friable schists to slate-like stones” (Robinson 1992:92) or of “metasedimentary” stone (Sanger et al. 1992:153) – both of which might indicate a lithic similarity to the rods from the Little League site. However, all of these rods appear to be much larger in dimensions than the largest of our rods. While metric measurements are not provided in the texts, the broken medial specimen from the Sharrow site appears to be about 50 mm in surviving length and 20 mm in width (Petersen 1991:106-107); the rods from Sunkhaze Ridge and Morrill's Point range from about 80 – 260 mm in length and are about 20 mm in width (Robinson 1992:92); and the rod from Blackman's Stream measures about 150 mm in length and 30 mm in width (Sanger et al. 1992:154).



Artifacts resembling stone rods have also been reported from loci 1, 2, 3, 6, and 8 at the Wapanucket site, 3 km upstream from the Little League site in Middleborough (Robbins 1980:34, 59, 73, 113, 235-237, 269-270). In the text they are referred to as "sharpening stones", and Robbins (1980:20) comments, "In general there are two categories: flat, irregularly shaped fragments and elongate, rounded pebbles." The latter category, at least based upon the two illustrations in Plate 19 on p. 237 (items B and H), appear to correspond in form to the rods from the Little League site. He indicates that in the burial complex, Feature #206, "five of the sharpening stones are natural pebbles" (1980:235), which appears to place them in the second category. As with the northern New England specimens, both of the rods illustrated are well outside the range of the largest of our rods (ca. 90 mm and 115 mm in length and 10-15 mm in width, respectively). Robbins provides a table of the dimensions of the "sharpening stones" on the same page as the illustration, but he does not indicate which measurements are associated with the two illustrated rods. They range in length from 4.5 cm to 16.0 cm; in width from 1.0 cm to 5.0 cm; and in thickness from 0.75 cm to 2.5 cm. For rods from the other Wapanucket loci, or outside of Feature #206 at Wapanucket 8, Robbins provides no differentiation in his artifact tables as to which of the two shape categories were found where. No indication of lithic material is provided. At least some of these rods derive from burial contexts dated to the Late and Transitional Archaic periods. At Wapanucket, several of the burials also contained black graphite and red hematite paintstones and quartz crystals, as at the Little League site. This is one further reason for supposing that the rods are part of the ceremonial apparatus, as the latter artifact types certainly are.

### Anthropogenic or Manuports?

The very unequal horizontal and vertical distribution of the rods suggests that there was deliberate intentionality in their deposition. What remains to be answered is whether the rods were procured from a natural source and are simply manuports, or whether they were shaped anthropogenically. To investigate this, the senior author called upon Dr. Richard Enright, a senior geologist at Bridge-

water State University, and asked him to look at a sample of the rods under 40x magnification. He first indicated that the rods are not in fact made of argillite; they are composed of small, rounded sand grains rather than being derived from clay. He referred to this material as a siltstone, which is likely to be part of the local bedrock, a mix of Pennsylvanian era coarse-grained arkose and fine-grained argillite (Hartshorn 1960). Siltstone is intermediate between these two in grain size (Tucker 2003:87). Accordingly, all of the data entries for rods have been corrected from argillite to siltstone, and this has also occasioned a search through the entire collection from the site to determine whether other artifacts were similarly misidentified. The proportion of siltstone artifacts, excluding rods, is 29.3% of the artifacts formerly identified as argillite. In addition, 44.0% of the "argillite" debitage from Terrace 2 was actually siltstone.

Second, Enright stated that he knew of no geological processes that could transform siltstone into cylindrical, or, even more radically, semi-cylindrical shapes such as those he inspected from the collection. He indicated that wave action can sometimes leave ripples in rock, and if the crests of the ripples were broken off they might have the size of the rods – but not their shape; they would be more angular, a trait which none of the rods display. He also noticed what he considered to be polishing on some of the rods he inspected. His view would seem to indicate that – like the polished pebbles which have been the subject of study in this *Bulletin* (Mulroy 2017), the rods are the result of anthropogenic activity – even the very small ones retrieved during the 2018 season.

However, the junior author undertook a literature search in sedimentological journals. Observing rock and grain textures can inform on the extent of wear, attrition, and other changes they have experienced over time. The shape of sedimentary particles thus can be a valuable physical attribute for interpreting depositional environment and history at a particular locale. Textural features such as roundness, sphericity, and size are especially useful in this regard, and largely point to mechanisms of transport and dispersal (Stanley and So 2006), when grains are abraded as a result of physical collision (with each other and bedrock). In typical geologic terms, sediment texture is a combination

of grain-size and distribution (i.e., sorting), grain morphology and surface features (i.e., shape and roundness vs. angularity), and the fabric of the sediment (i.e., relative to matrix) (Tucker 2011).

For clastic sediments, which are the broken remains of rocks of all types, the environment will dictate the range and nature of mechanisms acting upon grains and their texture (e.g., desert dunes, tidal beaches, cliff faces). Here, we are primarily concerned with sedimentary particles in stream (i.e., riverine) environments, where water flow is the primary mechanism behind abrasion, transport, and deposition (Bunte and Abt 2001). Particle alteration in this environment can be a complex function of lithology, duration and energy of water flow, and the nature of any post-depositional weathering. According to Rosgen (1994), particle size also plays a major factor in stream environments. For example, small streams in New England (e.g., the Nemasket River), typically have gravel- and cobble-bed constituencies, which can range from 2 - 64 mm (gravel) to 64 - 256 mm (cobble), respectively. In addition, some areas of a stream bed may contain numerous boulders (256 - 4,096 mm), thus yielding an even wider range of particle sizes, no doubt adding to the complexity of sediment-on-sediment abrasion within the stream.

The range of grain shapes is commonly discussed in the geologic literature, but the question herein is, if not anthropogenic, what natural mechanisms can produce such shapes in a stream environment? One potential explanation could be stream-bed imbrication, which is when grains shingle themselves in alignment with other grains and roll along their long-axes in the direction of stream flow (Figure 17). This phenomenon is especially common in gravel- to cobble-sized stream beds and can produce a high erosion threshold among sediments (Todd 1996). Considering the grain alignment, coupled with friction angle generated from such a motion (Cho et al. 2006), smooth and elongated sediment particles, like the ones recovered from the site, could easily have been abraded over time from the natural flow of the river.

To assess if rounded and elongated sediments are present elsewhere geologically, a focused investigation was conducted by the junior author at the

Blackstone River Canal and Heritage State Park, in Uxbridge, Massachusetts. This was done with the goal of obtaining comparative samples with the characteristic "rod-like" shapes similar to those recovered from archaeological contexts adjacent to the Nemasket River. The section of the Blackstone River surveyed is located downstream from two small spillways, and can be characterized as rather narrow (ca. 20 m across), with low-turbulence, and relatively shallow depths. Basic particle sizes were observed as a mix between gravel and cobble measurements on the shore and underwater (when visible).

Several underwater shovel tests (ca. 6) were taken just off the shoreline in shallow depths. Shoveled material was then water-screened to remove clastic sediments from the surrounding mud. Well-rounded and elongated grains ( $n=36$ ) were then visually identified in the cleaned sediment and removed. Similar grains were also identified and collected from adjoining sediment accumulations on the shoreline. Rounded and elongated samples (see Figure 18) are gravel-sized, ranging from granule (very fine) to pebble (medium/coarse) (following Wentworth 1922). The samples are extremely smooth with very low sphericity. Visual analysis under magnification reveals all but one of the samples are fine-grained sedimentary parent-rock (e.g., siltstone); the largest of the samples shows signs of schistose (metamorphic) lithology.

Compared with rods retrieved at the Little League site, rock samples collected from the Blackstone River reveal similarities in both shape and roundness as well as overall lithology (i.e., siltstone). As the stream-bed makeup is primarily gravel- to cobble-sized at both the Nemasket and Blackstone rivers, the potential for imbricated abrasion is likely among sediments at each. Also, considering the sample size achieved during such a limited survey of the Blackstone, those numbers would seem comparable with the thousands of elongated grains recovered archaeologically. This study did not address whether elongated stones were intentionally selected by Native Americans, but it does demonstrate a geologic process that could explain their presence in nearby river and stream bed deposits. We therefore conclude that the rods found at the site are most likely manuports, obtained from local streambed deposits and used for ceremonial purposes.



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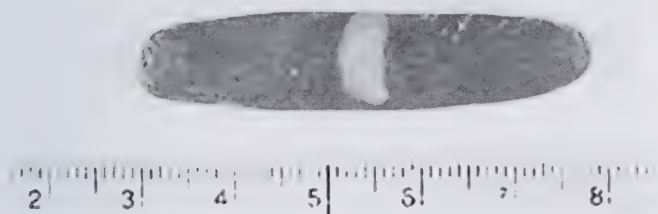


Figure 1: Stone rod from the Third Terrace



Figure 2: Stone rods from the First Terrace



Figure 3: Stone rods from the Second Terrace, 2015 Season



Figure 4: Stone rods from the Second Terrace, 2016 Season



Figure 5: Stone rods from the Second Terrace, 2017 Season



Figure 6: Stone rods from the Second Terrace, 2018 Season

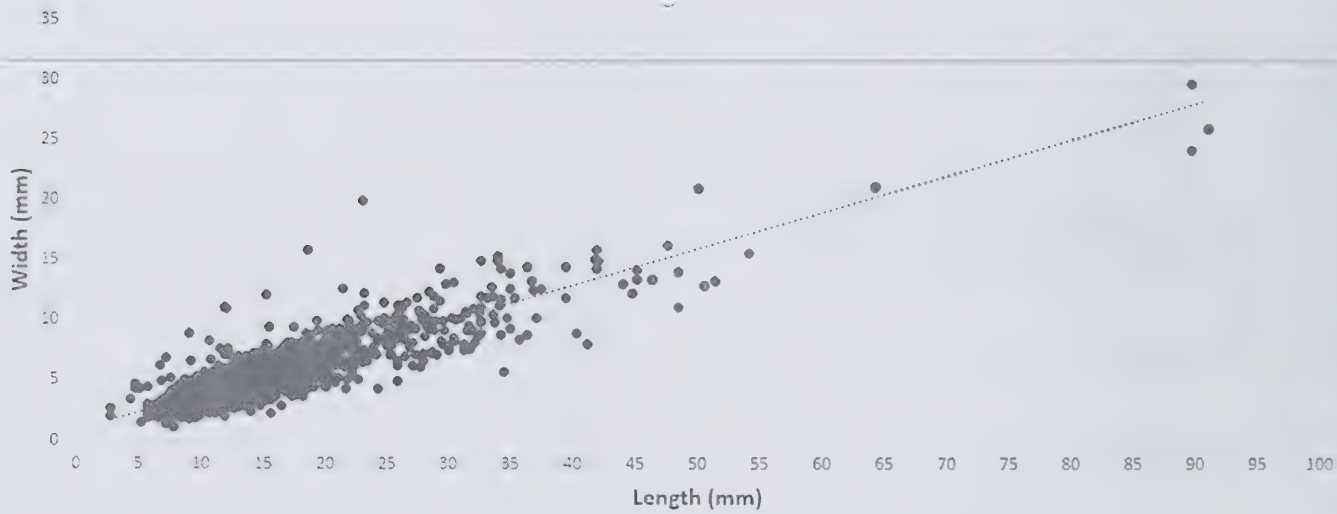


Figure 7: Scatterplot of length/width of stone rods, showing trend line



Figure 8: Horizontal distribution of stone rods on the Second Terrace





Figure 9: Map of features on the Second Terrace



Figure 10: Recoveries of rods from a single 5 cm level on the Second Terrace

Feature	FILL	A3	B1	B2	C	BALK	TOTAL
213	0	4	3	18	30	38	93
216*	0	11	13	151	45	18	238
220*	0	0	0	38	0	7	45
221	4	2	0	458	203	99	766
222	0	0	0	3	0	0	3
226	0	14	0	86	0	1	101
228	0	0	0	3	0	0	3
229	0	0	0	275	45	3	323
230*	0	13	0	280	0	2	295
232	0	2	0	4	0	0	6
234	0	0	0	84	0	1	85
236*	0	0	0	19	5	0	24
241*	0	11	0	20	0	0	31
243*	0	3	0	4	0	0	7
Non-Feature	0	1	18	0	0	1	20
TOTAL	4	61	34	1443	328	170	2040

Figure 11: Distribution of stone rods by stratigraphic level

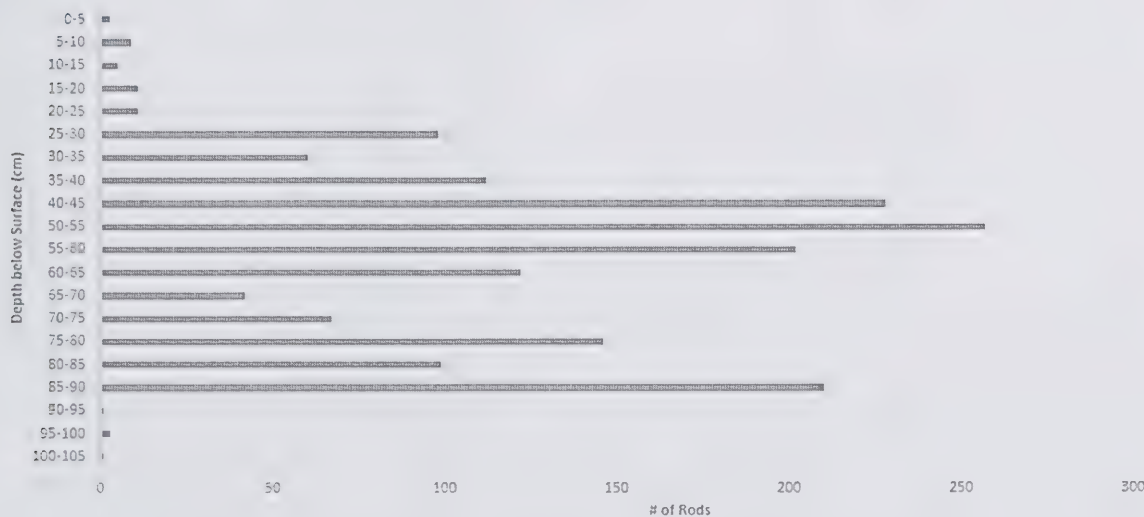


Figure 12: Distribution of stone rods by depth below surface

Depth (cm)	Rods	Rank	Paint-stones	Rank	rods/ps Sq. Diff.	Polished Pebbles	Rank	rods/opp Sq. Diff.
100-105	1	20.5	0	20	0.25	0	21	0.25
95-100	3	18.5	0	20	2.25	2	20	2.25
90-95	1	20.5	1	17.5	9	10	17	12.25
85-90	210	4	1	17.5	182.25	13	16	144
80-85	99	9	3	16	49	26	14	25
75-80	146	6	0	20	196	9	18.5	156.25
70-75	67	11	20	13	4	27	13	4
65-70	42	13	29	11	4	43	9	16
60-65	122	7	25	12	25	42	10.5	12.25
55-60	202	5	48	9	16	112	5	0
50-55	257	1	88	2	1	172	2	1
40-45	228	2	70	4	4	139	3	1
35-40	112	8	55	7	1	104	6	4
30-35	60	12	54	8	16	122	4	64
25-30	98	10	66	5	25	100	7	9
20-25	11	14.5	74	3	132.25	60	8	42.25
15-20	11	14.5	61	6	72.25	41	12	6.25
10-15	5	17	37	10	49	42	10.5	42.25
5-10	9	16	17	14	4	17	15	1
0-5	3	18.5	9	15	12.25	9	18.5	0
					0.487			0.648
				P=	0.05		P=	0.002

Figure 13: Spearman ranked comparison of distribution of stone rods, paintstones, and polished pebbles by depth below surface

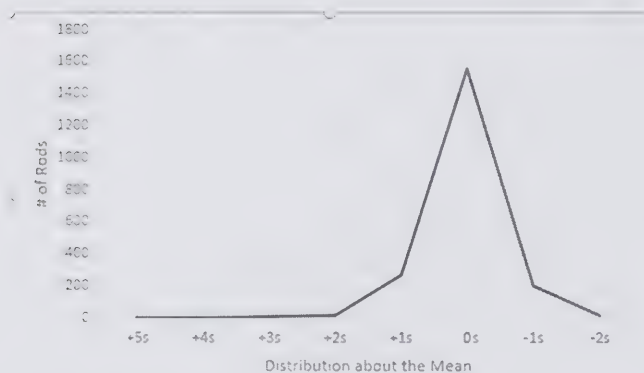


Figure 14: Distribution of length/width ratios of stone rods

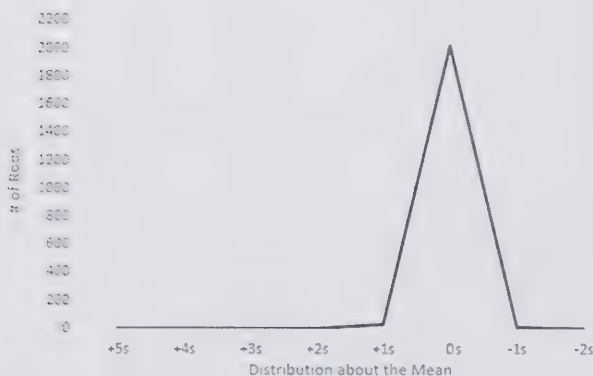


Figure 15: Distribution of length/thickness ratios of stone rods



Figure 16: Distribution of width/thickness ratios of stone rods

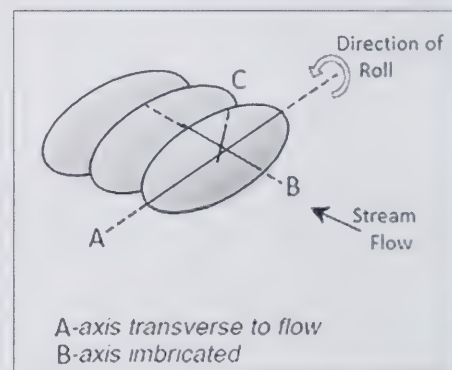


Figure 17: Example of stream-bed grain imbrication relative to flow (modified from Bunte and Apt 2001).



Figure 18: Stone rods retrieved from Blackstone River deposits



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## NOTES TO CONTRIBUTORS

The Editor solicits for publication original contributions related to the archaeology of Massachusetts. Authors of articles submitted to the *Bulletin of the Massachusetts Archaeological Society* are requested to follow the style guide for *American Antiquity* (48:429-442 [1983]). Manuscripts should be sent to the Editor for evaluation and comment at [c1hoffman@bridgew.edu](mailto:c1hoffman@bridgew.edu).

For shorter manuscripts (5 pages or less), texts may be submitted as paper copies. Longer manuscripts should be submitted as electronic files (preferably MicroSoft Word .doc or .docx files, or .rtf files). All text should have margins of 3 centimeters (1¼ inch) on all edges. For electronic files, do not insert artificial spaces between lines; instead, use the Format/Paragraph/Line Spacing function and select "Double". Proper heading and bibliographic material must be included.

Bibliographic references should be listed alphabetically by author's last name and presented as follows:

Gookin, Daniel

1970 *Historical Collections of the Indians of New England* (1674). Jeffrey H. Fiske, annotator.  
Towtaid, Worcester MA.

Luhman, Hope E.

2007 Approaching Relevance: Public Outreach and Education in CRM. *Northeast Anthropology*  
73:33-41.

Several references by the same author should be listed chronologically by year. Multiple references by the same author from the same year should have lower case letters (e.g. "a", "b") following the year. Reference citations in the text should include the author's name, date of publication, and the page or figure number, all enclosed in parentheses, as follows: (Bowman and Zeoli 1973:27) or (Ritchie 1965: Fig. 12). All information derived from published sources must be cited, whether it is directly quoted or paraphrased. Please check to make sure that all citations in the text match bibliographical entries, especially dates of publication.

All illustrations and tables, called figures, should be submitted as separate electronic originals. If a large number of figures is involved, authors may use DropBox to send them to the Editor. Tables should be submitted as separate Excel (.xls or .xlsx) spreadsheets and not incorporated into the text. Figures should be submitted as .tif files, high resolution (**600 dpi minimum**), in greyscale. Each figure should fit within the space available on a *Bulletin* page, which is 17 cm by 23 cm (6½ x 9 inches), allowing for margins. Full, half or quarter page figures should be planned carefully. Width dimensions for one-column images are 3.35 inches (8.5 cm). Space must be allowed for captions. Captions should be in title case and should accompany the text in a separate section, in order and numbered to correspond to the figures.

Figures must be referred to in the text and are to be numbered in their order of reference, with their number indicated in the file name. Every item in each figure and each person should be identified. All lettering must be clear and legible. Scales with dimensions, preferably in metric measurements, should be included with all figures for which they are appropriate.

Dimensions and distances should be given in metric units or in metric units and English units, to the same standard of accuracy (e.g., 10 cm or 2.5 inches, not 2.54 inches).

Authors should include a brief (one paragraph) biography for the "Contributors" page of the *Bulletin* issue.







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